

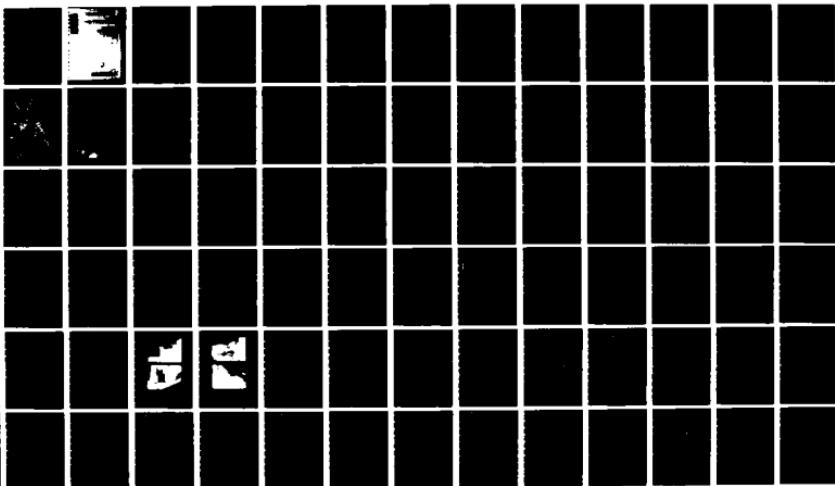
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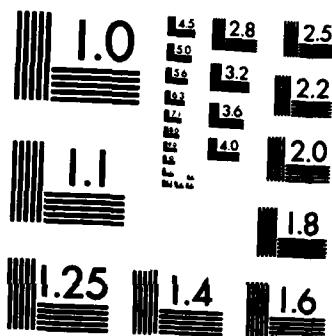
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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER  CT 00091	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle)  Lower Housatonic River Basin Shelton, Conn., Trap Falls Reservoir Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED  INSPECTION REPORT
7. AUTHOR(s)  U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS  DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		12. REPORT DATE  August 1978
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17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)  DAMS, INSPECTION, DAM SAFETY,  Lower Housatonic River Basin Shelton, Conn. Trap Falls Reservoir Dam		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  The dam is a concrete gravity structure with concrete buttresses adjacent to the downstream face of the dam spaced at approx. 18 ft. on center. An earthen embankment slopes down from the exposed concrete section at a maximum inclination of 2 horizontal to 1 vertical on the downstream side of the dam. The structure is approximately 1080 ft. long and has a maximum height of approximatley 48 ft. above the old streambed. Outlets consist of a 30 inch cast iron low level line at elevation 172, a 30 inch cast iron transmission main and an 8 inch cast iron service main. The spillway is a 137 ft. wide anpe-shaped concrete weir with concrete sidewalls.		

TRAP FALLS RESERVOIR DAM

CT 00091

LOWER Housatonic River Basin  
SHELTON, CONNECTICUT



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PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM

BRIEF ASSESSMENT  
PHASE I INSPECTION REPORT  
NATIONAL PROGRAM OF INSPECTION OF DAMS

Name of Dam:	TRAP FALLS RESERVOIR
Inventory Number:	CT 00091
State Located:	CONNECTICUT
County Located:	FAIRFIELD
Town Located:	SHELTON
Stream:	PUMPKIN GROUND BROOK
Owner:	BRIDGEPORT HYDRAULIC CO.
Date of Inspection:	JUNE 8, 1978
Inspection Team:	PETER HEYNEN MICHAEL HORTON GONZALO CASTRO HECTOR MORENO

The dam is a concrete gravity structure with concrete buttresses adjacent to the downstream face of the dam spaced at approximately 18 feet on center. An earthen embankment slopes down from the exposed concrete section at a maximum inclination of 2 horizontal to 1 vertical on the downstream side of the dam. The structure is approximately 1080 feet long and has a maximum height of approximately 48 feet above the old streambed. Outlets consist of a 30 inch cast iron low level line at elevation 172, a 30 inch cast iron transmission main and an 8 inch cast iron service main. The spillway is a 137 foot wide nappe-shaped concrete weir with concrete sidewalls. The area downstream of the dam consists of residential and industrial developments, Connecticut Route 8, and further downstream, urban areas of Stratford.

Based upon visual inspections at the site and past performance history, the dam appears to be in good condition. No evidence of structural instability was observed in the concrete section, buttresses or the earthen embankment. However, there are some areas which require attention.

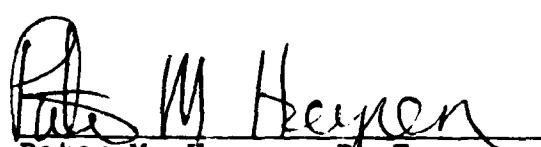
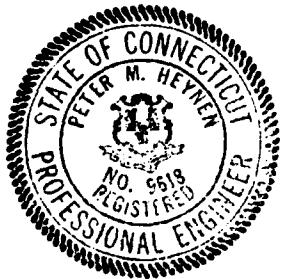
Based upon the size (Intermediate) and hazard classification (High) in accordance with Corps guidelines, the test flood will be equal to the Probable Maximum Flood (PMF).

Based upon our hydraulic computations, the spillway capacity is 4300 cubic feet per second, which is in excess of 100 percent of the Test Flood. Peak inflow to the reservoir is 2600 cubic feet per second; peak outflow (Test Flood) is 1400 cubic feet per second with the dam maintaining a minimum freeboard of 1.8 feet. The peak failure outflow from the dam breaching would be 128,000 cubic feet per second. A breach of the dam would develop a 24 foot wave downstream of the dam causing flooding and severe loss of life and damage to property.

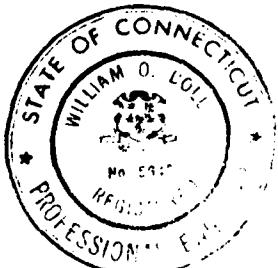
It is recommended that the left wingwall adjacent to the spillway be monitored to ascertain whether movement which has occurred to date is continuing. Should the wall movement continue, it may be necessary to take remedial action, such as installation of weep holes or placement of freely draining material behind the wall and possible repair of the wall itself.

An operation and maintenance plan should be instituted as described in Section 7.

The above recommendations and remedial measures should be instituted within one year of the owner's receipt of this Phase I Inspection Report.



Peter M. Heynen, P. E.  
Project Manager  
Cahn Engineers, Inc.



William O. Doll, P. E.  
Chief Engineer  
Cahn Engineers, Inc.

This Phase I Inspection Report on Trap Falls Reservoir Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

Charles G. Tiersch

CHARLES G. TIERSCH, Chairman  
Chief, Foundation and Materials Branch  
Engineering Division

Fred J. Ravens Jr.

FRED J. RAVENS, Jr., Member  
Chief, Design Branch  
Engineering Division

Saul Cooper

SAUL COOPER, Member  
Chief, Water Control Branch  
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR  
Chief, Engineering Division

## PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspection. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionarily in nature. It would be incorrect to assume that the present condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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Data and Correspondence

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Drawings

"Proposed Section, Trap Falls Dam"  
Huntington, Connecticut  
Bridgeport Hydraulic Company  
Albert B. Hill  
Sept. 15, 1904

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"Plans for Gatehouse"  
Trap Falls Reservoir  
Bridgeport Hydraulic Company  
Albert B. Hill  
March 2, 1905

B-54

"Map, Plan and Profile"  
Trap Falls Dam  
Bridgeport Hydraulic Company  
Albert B. Hill  
March 3, 1905

B-55

"Cross-Sections, Elevation & Plan Showing  
Alterations"  
Trap Falls Dam  
Huntington, Connecticut  
Albert B. Hill  
June 16, 1916

B-56

"Outlet Works Improvements-Upper Gatehouse  
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Hazen and Sawyer  
February 1963

B-57

"Outlet Works Improvements-New Screen Chamber"  
Trap Falls Dam  
Hazen and Swayer  
February, 1963

B-58

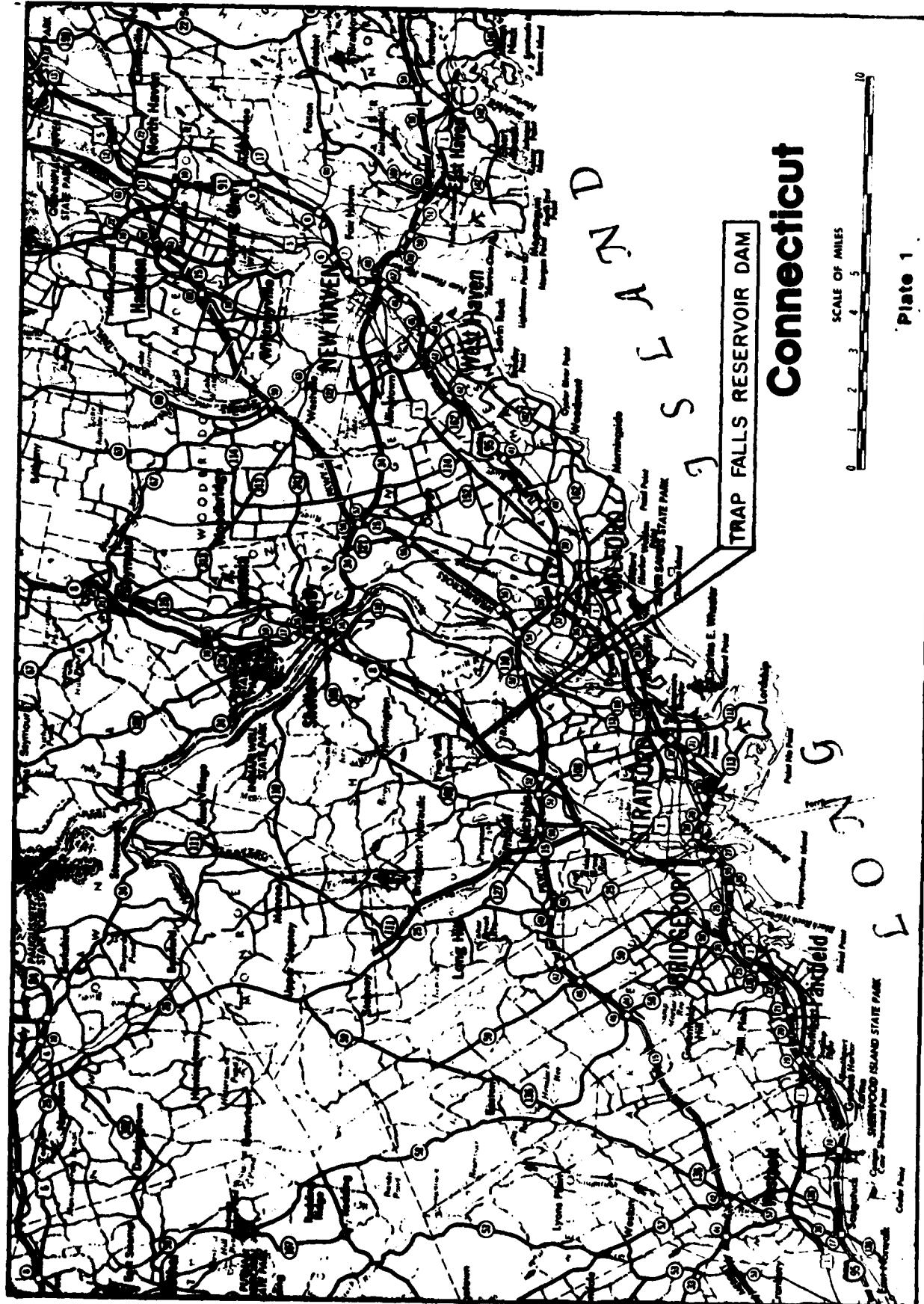
"Outlet Works Improvements-New Screen Chamber" Trap Falls Dam March 26, 1963	B-59
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\* Note: See special Note Appendix Section B - Availability of Data

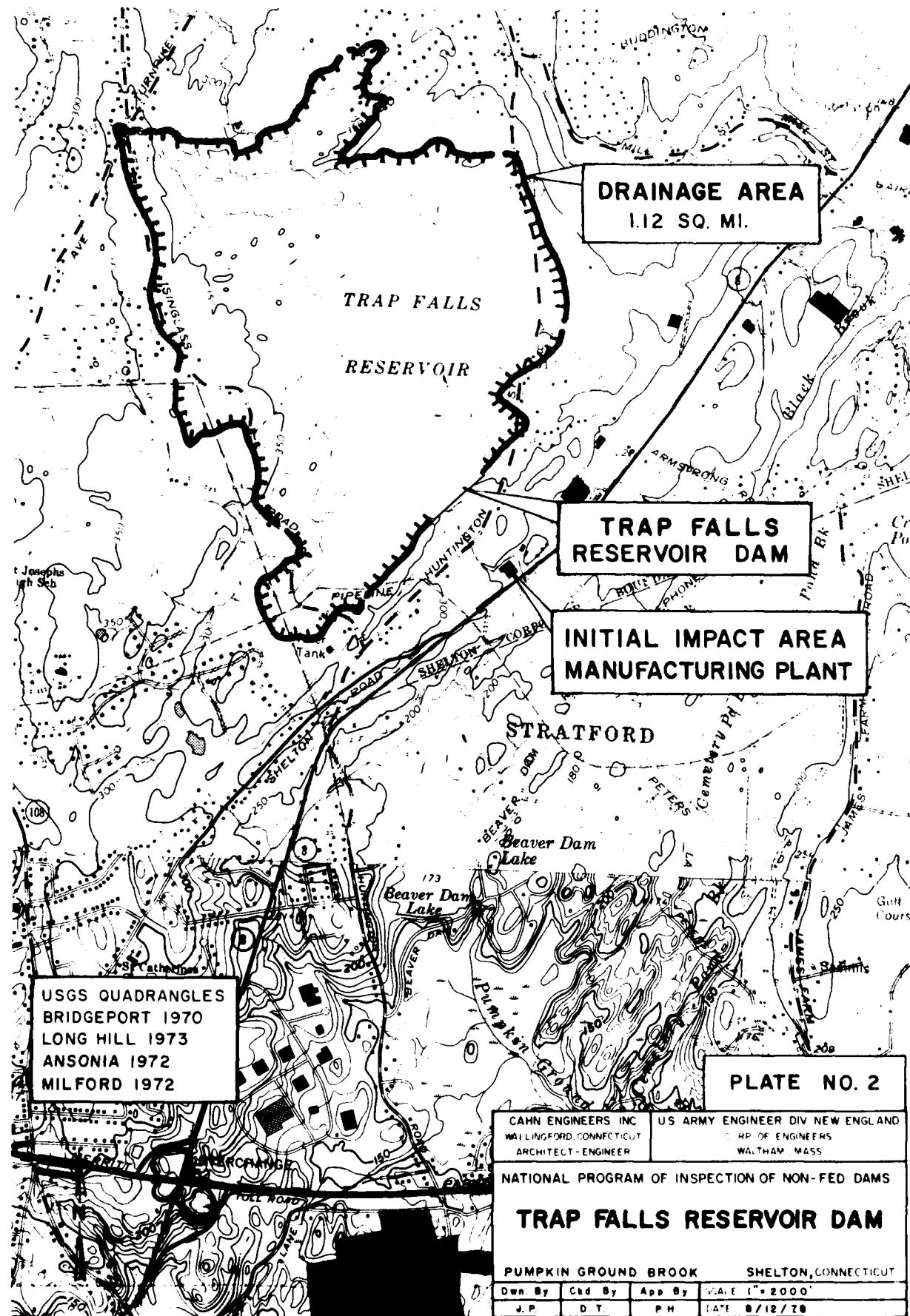
US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS	TRAP FALLS RESERVOIR DAM PUMPKIN GROUND BROOK	SHELTON CONNECTICUT	DATE 6/8/78 CE# 27 531 GI PAGE X
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OVERVIEW PHOTO





1  
Piano



PHASE I INSPECTION REPORT  
TRAP FALLS RESERVOIR DAM  
SECTION I  
PROJECT INFORMATION

1.1 General

a. Authority - Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Cahn Engineers has been retained by the New England Division to inspect and report on selected dams in the southwestern state of Connecticut. Authorization and notice to proceed were issued to Cahn Engineers, Inc. under a letter of April 26, 1978 from Ralph T. Garver, Colonel, Corps of Engineers. Contract No. DACW33-78-C-0310 has been assigned by the Corps of Engineers for this work

b. Purpose of Inspection Program - The purposes of the program are to:

- (1) Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correction in a timely manner by non-federal interest.
- (2) Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dams.
- (3) To update, verify and complete the National Inventory of Dams.

c. Scope of Inspection Program - The scope of this Phase I inspection report includes:

- (1) Gathering, reviewing and presenting all available data as can be obtained from the owners, previous owners, the state and other associated parties.
- (2) A field inspection of the facility detailing the visual condition of the dam, embankments and appurtenant structures.

- (3) Computation concerning the hydraulic and hydrology of the facility and its relationship to the calculated flood through the existing spillway.
- (4) An assessment of the condition of the facility and corrective measures required.

It should be noted that this report does not pass judgement on the safety or stability of the dam other than on a visual basis. The inspection is to identify those features on the dam which need corrective action and/or further study.

## 1.2 Description of Project

a. Description of Dam and Appurtenances - The dam is a concrete gravity structure with concrete buttresses adjacent to the downstream face of the dam spaced at approximately 18 feet on center. An earthen embankment slopes down from the bottom of the exposed concrete section at a maximum inclination of 2 horizontal to 1 vertical on the downstream side of the dam. The structure is approximately 1080 feet long and has a maximum height of approximately 48 feet above the old streambed. The upper gatehouse and screen house are located on and adjacent to the exposed concrete section near the center of the dam, while the control room including the treatment plant and the booster pumping station are located below at the toe of the downstream earthen embankment. Outlets consist of a 30 inch cast iron low level line at elevation 272, a 30 inch cast iron transmission main, and an 8 inch cast iron service main. The spillway is a 137 foot wide nappe-shaped concrete weir with concrete sidewalls. The bottom of the spillway channel is lined with hand placed stone, while the sidewalls are of concrete. The area downstream of the dam consists of residential and industrial development, Connecticut Route 8, and further downstream, urban areas of Stratford.

b. Location - The dam is located on Pumpkin Ground Brook in a rural residential area of the town of Shelton, County of Fairfield, State of Connecticut. The dam is shown on the Long Hill U.S.G.S. Quadrangle as having coordinates of longitude W73° 8' 26" and latitude N41° 15' 55".

c. Size Classification - **INTERMEDIATE** - The storage is 8500 acre feet at the top of the dam, elevation 319.8, which is approximately 48 feet above the elevation of the old streambed. According to the Recommended Guidelines, a dam with from 1000 to 50,000 acre feet of storage is classified as being Intermediate.

d. Hazard Classification - **HIGH** (Category I) -The area downstream of the dam includes residential and industrial developments, Connecticut Route 8 and urban developments in the town of Stratford. A breach of the dam has potential for severe loss of life and property damage.

e. Ownership - The Bridgeport Hydraulic Company  
835 Main Street  
Bridgeport, Connecticut  
Mr. Edward Stangl  
Phone (203) 372-1766

f. Purpose of Dam - Public Water Supply

g. Design and Construction History - The following information is believed to be accurate based upon the plans and correspondence available and included in the Appendix. The dam was originally constructed in 1905 and raised approximately 11 feet in 1916 to its present elevation. The 1905 construction and the 1916 modifications were engineered by Albert B. Hill. In 1963, the outlet works were improved to provide increased service capacity. This construction was performed by E & F Construction Company as engineered by Hazen and Sawyer, Engineers. A large pump station and control room addition to the treatment plant were constructed in 1967.

h. Normal Operational Procedures - The reservoir is maintained as high as possible without overflowing the spillway, in order to provide adequate water supply. Diversions from Mean Brook, Farm Mill River, and the Housatonic River feed into the reservoir. As of 1963, approximately 30 percent of the water distributed by the Bridgeport Hydraulic Company passed through Trap Falls Reservoir.

### 1.3 Pertinent Data

a. Drainage Areas - 1.1 square miles (704 acres). Rolling, wooded terrain.

b. Discharge at Dam Site - Maximum Known Flood -8 3/4" over the spillway on October 16, 1955. Total spillway capacity at elevation 319.8 (top of dam) 4300 cfs.

c. Elevation - (Ft above MSL, USGS Datum)

Top of dam:	319.8
Spillway Crest:	315.8
Streambed:	271.8
High Level Intake: (downstream face of dam)	278+
Low Level Intake: (downstream face of dam)	272+

d. Reservoir - Length of Normal Pool:

Length of Maximum Pool: 6000 ft.

e. Storage - At Elevation 315.8 7100 acre ft.

At Elevation 319.8 8500 acre ft.  
(top of dam)

f. Reservoir Surface -

At Elevation 315.8	344 acres
At Elevation 319.8	344+ acres

g. Dam - Type: Concrete gravity section with downstream concrete buttresses and earthen embankment.

Length: 1080+ feet

Height: 48+ ft. above original streambed

Top Width: 11 feet

Side Slope: Downstream 2H to 1V

Impervious Core: Concrete structure.

Cutoff: Available data indicates founded on rock.

h. Diversion and Regulatory Tunnel - Not Applicable.

i. Spillway

Type: Concrete weir.  
Length of Weir: 138 feet  
Crest Elevation: 315.8  
Upstream Channel: None  
Downstream Channel: Hand-placed stone.

j. Regulatory Outlets

High Level Intake: Size 30 inch dia. cast iron transmission line mechanically operated and located in downstream face at approximate elevation 278.

Low Level Intake: Size 30" dia. cast iron, mechanically operated, and located in downstream face at approximate elevation 272.

## SECTION 2: ENGINEERING DATA

### 2.1 Design

a. Available Data - The available data consists of drawings, correspondence, calculations, and reports by the Bridgeport Hydraulic Company, Roald Haestad, Inc., Dames and Moore, Albert B. Hill, Hazen and Sawyer, and others. The majority of correspondence pertains to yearly inspection reports of Bridgeport Hydraulic Company Dams, including Trap Falls Reservoir Dam.

b. Design Features - The maps and drawings included in the Appendix show the design features of the dam as stated previously herein.

c. Design Data - There were no engineering values, assumptions, test results or calculations available for the original construction or later spillway reconstruction. The design data available addresses only the hydraulic/hydrologic characteristics of the facility.

### 2.2 Construction

a. Available Data - The only construction data available consists of "As-Built" plans for the original dam and the 1916 raising, and for the facility improvements, all of which are included in the Appendix Section B.

b. Construction Considerations - No information was available.

### 2.3 Operation

Lake level readings are taken daily. No formal operation and maintenance, or documentation procedures are in effect. Someone is usually present at the dam site during the day.

### 2.4 Evaluation

a. Availability - Existing data was provided by the owner, the Bridgeport Hydraulic Company. The owner made the dam available for visual inspection.

b. Adequacy - The engineering data available was not sufficient to perform an in-depth assessment of the dam. Therefore, the final assessment of this investigation must

be based primarily on visual inspection, performance history and hydraulic/hydrologic assumptions.

C. Validity - A comparison of record data and visual observations reveals no observable significant discrepancies in the record data.

## SECTION 3: VISUAL INSPECTION

### 3.1 Findings

a. General - In general, the dam appears to be in good condition, however, there are some areas in need of maintenance.

#### b. Dam

Downstream Slope - The downstream slope of the earth embankment is grass covered and is, in general, in good condition. At several locations some minor sloughing of the slope has taken place. At one such area in front of the 23rd concrete wall arch (from the left abutment), the depression and bulge are between 6 in. to 2 ft in depth and height, and each is about 4 ft. by 4 ft in area. The soil at the top of the embankment is soft and has local depressions at several locations, generally in the inside of the arches, i.e. next to the concrete buttresses. No seeps, wet or spongy areas were observed on the downstream embankment slope. However, the previous night it had rained, and thus minor wet areas or seeps could not have been detected.

Crest - The concrete crest of the dam in general appears to be in good condition. Some seepage has occurred at construction joints on the downstream face of dam resulting in efflorescence and spalling of concrete surfaces. Heavy spalling has also occurred at the right end of the dam adjacent to the spillway. There have been movements of a block of concrete at the end of the concrete dam wall. There is no visual evidence of these movements being related to foundation movements.

#### c. Appurtenant Structures

Spillway - The spillway was excavated in bedrock, which is exposed at the right abutment and immediately downstream of the spillway. There is a minor seep through the bedrock observed at the left side and a few feet downstream of the spillway. The water is clear. The right wingwall of the spillway does not have weep holes, and it is in good condition. The left wall has moved into the spillway channel apparently by rotation on its foundation. This is probably due to a combination of freezing pressures and water pressures which, because of the absence of weep holes through the wall, are superimposed on the existing earth pressures.

The spillway channel is in good condition, the bottom consisting of hand-placed stone. There is a small amount of vegetation growth which should be periodically removed. There are some trees whose branches hang over the channel, which do not represent a potential for future obstruction of the channel.

### **3.2 Evaluation**

The visual inspection was sufficient to assess the dam as being generally in good condition. However, some features will require continuing periodic inspection and/or maintenance.

1. The left wing wall of the spillway has apparently moved continuously, and references to the movements and repair of the cracks are made in several prior inspection reports. The movements to date are not large enough to endanger the safety of the wall; however, the continuous attention required by the wall movements would indicate that some remedial action should be taken in the future, such as installation of weep holes and a drainage layer against the wall to reduce water pressures and also to reduce pressures due to freezing soil behind the wall.
2. The minor sloughing of the downstream slope and the soft area, and depressions on the top of the earth embankment, probably indicate the result of leaks through the concrete wall above and below the level of the top of the embankment. However, there are no indications of a significant stability problem of the earth embankment as a result of such leaks.

## SECTION 4: OPERATIONAL PROCEDURES

### 4.1 Regulating Procedure

The reservoir is maintained as high as possible without overflowing the spillway, in order to provide an adequate water supply as needed. In addition to the reservoir drainage area, Mean Brook diversion reservoir and diversions from the Farm Mill River and the Housatonic River supply water to the reservoir. A description of the operational facilities used to regulate the water flow through the outlet works is included in the Bridgeport Hydraulic Company correspondence in the Appendix, Section B.

### 4.2 Maintenance of Dam

The grassed area is well maintained, and the dam presents a good appearance. The concrete surfaces of the dam are not well maintained, especially around the spillway and construction joints, which are heavily spalled in places. The left spillway channel wall is cracked and has undergone significant movement. The maintenance which has been performed to correct these problems to date has not been effective.

### 4.3 Maintenance of Operating Facilities

To our knowledge, there are no formal operational procedures or documentation of procedures that are followed. The 30 inch transmission main is used to supply water to the Bridgeport area, and is maintained to continue operation. The 30 inch low level line is opened at least once a year for 24 hours, closed, and then opened again for 24 hours.

### 4.4 Description of Any Warning System in Effect

There is no formal warning system in effect. The owner employs a security guard to visit the dam once a day.

### 4.5 Evaluation

A formal program of operation and maintenance procedures should be instituted, to include accurate documentation of all procedures for future reference.

## SECTION 5: HYDRAULIC/HYDROLOGIC

### 5.1 Evaluation of Features

a. Design Data - No design computations could be found for the original 1905 dam construction, the 1916 raising of the dam, or facility improvements made in 1963 or 1969.

b. Experience Data - The maximum recorded water level over the spillway during the August and October 1955 floods was 8 3/4 inches on October 16, 1955.

c. Visual Observations - Although trees overhang the spillway channel in places, it is unlikely that any blockage of the spillway would occur.

d. Overtopping Potential - The Test Flood for this high hazard intermediate size dam is equal to the Probable Maximum Flood (PMF) of 1400 cfs.

Based upon our hydraulics computations, the spillway capacity is 4300 cubic feet per second (Appendix D-9). Based upon "Preliminary Guidance for Estimating Maximum Probably Discharges" dated March 1978, peak inflow to the reservoir is 2600 cubic feet per second (Appendix D-8); peak outflow (Test Flood) is 1400 cubic feet per second with the dam maintaining a 1.8 foot minimum freeboard (Appendix D-10).

Since the watershed area (1.1 square miles) of Trap Falls is smaller than two square miles, it may be appropriate to consider higher intensity short duration storms. One such calculation is shown in Appendix D.

e. Spillway Adequacy - The spillway will pass in excess of 100 percent of the Test Flood at elevation 319.8 (top of dam elevation), while maintaining a minimum dam freeboard of 1.8 feet.

f. Downstream Flooding - Utilizing the April 1978 "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs", the peak failure outflow from the dam would be 128,000 cfs (Appendix D-14). A breach of the dam would result in a 24 foot wave immediately downstream causing severe loss of life and property damage.

## SECTION 6: STRUCTURAL STABILITY

### 6.1 Evaluation of Structural Stability

a. Visual Observations - The observations discussed in Section 3 did not disclose any immediate stability problem. As discussed in Section 3, minor sloughing of the embankment and movement of the left spillway channel wall should be monitored to determine whether further deterioration occurs. Concrete surfaces, especially around construction joints and at the spillway and abutment walls, are heavily spalled and in need of maintenance. Spalling around the construction joints caused by seeps is usually accompanied by efflorescence and staining of the wall.

b. Design and Construction Data - The design and construction data available is not sufficient to perform a formal stability analysis. For example, there is no data on the foundation grade, or on the criterion for bedrock excavation to reach the foundation grade of the original dam and of the buttresses when the dam was raised. The earth embankment materials for the embankment zoning are not known, so that the contribution of the earth embankment to the overall dam stability cannot be assessed.

c. Operating Records - The operating records do not contain information that indicates past stability problems. Observed movements of the spillway left wall and soft areas and depressions in the earth embankment have been recorded.

d. Post-Construction Changes - Since raising of the dam in 1916, modifications of the outlet structures have been made which involved excavating into the downstream embankment. Some settlements of the ground were observed against such structures, reflecting some consolidation of the backfill around the structures. There are however, no visual indications that modifications and additions to the outlet structures have caused any stability problems.

e. Seismic Stability - This dam is in Seismic Zone 1 and hence does not have to be evaluated for seismic stability, according to the Recommended Guidelines.

## SECTION: 7 ASSESSMENT, RECOMMENDATIONS & REMEDIAL MEASURES

### 7.1 Dam Assessment

a. Condition - Based upon the visual inspection at the site and past performance history, the dam appears to be in good condition. No evidence was observed of structural instability in the embankment or concrete section, and the condition of the earth embankment is generally good. There are some areas which require attention.

Minor excavations have been made on the embankment near the downstream toe, and minor old sloughs are apparent on the downstream slope near the face of the dam. Construction at the toe of the downstream slope should probably be discouraged.

Based upon our hydraulics computations, the spillway capacity is 4300 cubic feet per second, which is in excess of 100 percent of the Test Flood. Based upon "Preliminary Guidance for Estimating Maximum Probable Discharges" dated March 1978, peak inflow to the reservoir is 2600 cubic feet per second; peak outflow (Test Flood) is 1400 cubic feet per second with the dam maintaining a 1.8 foot minimum freeboard.

Utilizing the April 1978 "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs", the peak failure outflow from the dam would be 128,000 cubic feet per second. A breach of the dam would result in a 24 foot wave which would cause severe loss of life and damage to property downstream of the dam at residences and a manufacturing plant.

b. Adequacy of Information - The design and construction information is inadequate to perform an in-depth assessment of the dam. Therefore, the assessment of the condition of the dam is based solely on a visual inspection and on verbal and written accounts of the performance of the dam.

c. Urgency - The recommendations and remedial measures presented in Sections 7.2 and 7.3 should be implemented within the time frame specified in each section.

d. Need for Additional Information - There is a need for additional information as described in Section 7.2.

## 7.2 Recommendations

The recommendations presented in this section should be implemented within one year of the owner's receipt of this Phase I Inspection Report.

1. The movements of the left wingwall of the spillway should be monitored, and if the rate of movements indicate it necessary, remedial action should be taken, such as the installation of weep holes and placement of a properly filtered layer of free draining material against the back of the wall. Should damage to the wall increase, it may also become necessary to perform repair work on the wall itself.

## 7.3 Remedial Measures

a. Alternatives - This study has identified no practical alternatives to the above recommendations.

b. Operation and Maintenance Procedures - The following measures must be undertaken within one year of the owner's receipt of this report, and continued on a regular basis.

1. Normal maintenance of the spillway channel should require cutting of tree branches overhanging the channel in addition to continuing the removal of vegetation from the channel bottom.
2. Minor sloughing of the ground surface on the downstream face and near the top of the embankment should be observed periodically to assure that no further movement is occurring.
3. Maintenance of spalled concrete where it occurs at construction joints and concrete surfaces should be carried out on a regular basis. Leaching of water through construction joints and cracks in the concrete surfaces should be repaired to prevent further deterioration of the concrete.
4. A formal program of operation and maintenance procedures should be instituted, and fully documented to provide accurate records for future reference.
5. The program of yearly inspections of the dam by an engineer qualified in dam inspection should be continued.

6. Round the clock surveillance should be provided by the owner during periods of unusually heavy precipitation. The owner should develop a formal warning system with local officials for alerting downstream residents in case of emergency.

**APPENDIX**  
**SECTION A: VISUAL OBSERVATIONS**



## PERIODIC INSPECTION CHECK LIST

Page 1 of 2

PROJECT Trap Falls Reservoir DamDATE June 8, 1978PROJECT FEATURE Concrete and Earth Dam Embankment

AREA EVALUATED	BY	CONDITION
<u>Concrete Structure</u>		
Crest Elevation	PH	Concrete Parapet uniform across top elevation 316.
Current Pool Elevation	PH	one (1) inch below spillway crest.
Maximum Impoundment to Date	PH	Recorded daily. Records at Bridgeport office.
General Condition of Concrete Surfaces	PH/ MH	Heavily spalled.
Condition of Joints	MH	Generally poor, spalling.
Spalling	PH/ MH	Yes.
Visible Reinforcing	MH	Occasional end of reinforcing rod.
Rusting or Staining of Concrete	PH	Yes.
Any Seepage or Efflorescence	PH/ MH	Yes.
Joint Alignment	PH/ MH	Satisfactory.
Cracking	MH	Some.
Rusting or Corrosion of Steel	MH	None.
Erosion or Cavitation	MH	None.
Alignment of Monoliths	MH	Good.
Numbering of Monoliths	MH	Some settlement at right end of dam.
Differential Settlement	GC	None apparent except at right end of wall which does not appear to be related to the foundation.
Condition of Structure Foundation		No observable problems.
Structure Additions	PH	Dam raised 10' in 1916.

## PERIODIC INSPECTION CHECK LIST

Page 2 of 2

PROJECT Trap Falls Reservoir Dam

DATE June 8, 1978

PROJECT FEATURE Concrete and Earth Dam Embankment

AREA EVALUATED	BY	CONDITION
<u>Earth Fill</u>		
Surface Cracks	GC	None apparent.
Lateral Movement	GC	Minor slumping of slope at several locations.
Vertical Alignment	GC	No misalignment observable.
Horizontal Alignment	GC	No misalignment observable.
Condition at Abutment and at Concrete Structures	GC	Good except soft at some locations next to buttresses.
Indications of Movement of Structural Items on Slopes	GC	None apparent.
Trespassing on Slopes	PH	Test pits.
Sloughing or Erosion of Slopes or Abutments	PH	Slight at top of embankment.
Rock Slope Protection-Riprap Failures	GC	Not applicable.
Unusual Movement or Cracking at or near Toes	GC	None apparent.
Unusual Embankment or Downstream Seepage	GC	None observed.
Piping or Boils	GC	None observed.
Foundation Drainage Features	GC	None known.
Toe Drains	GC	None known.
Instrumentation System	PH	Right end of dam, horizontal only.

## PERIODIC INSPECTION CHECK LIST

Page 1 of 1

PROJECT Trap Falls Reservoir DamDATE June 8, 1978PROJECT FEATURE Spillway-Approach, Channel, Weir, Discharge Channel

AREA EVALUATED	BY	CONDITION
a. <u>Approach Channel</u>		Not applicable.
General Condition		
Loose Rock Overhanging Channel		
Trees Overhanging Channel		
Floor of Approach Channel		
b. <u>Weir and Training or Sidewalls</u>		
General Condition of Concrete	MH	Sidewalls spalled, cracked.
Rust or Staining	PH	Yes, left abutment.
Spalling	PH	Yes, minor areas except left abutment.
Any Visible Reinforcing	PH	None apparent.
Any Seepage or Efflorescence	MH	Yes.
Drain Holes	GC	None.
c. <u>Discharge Channel</u>		
General Condition	GC	Good.
Loose Rock Overhanging Channel	GC	None.
Trees Overhanging Channel	GC	A few.
Floor of Channel	GC	Good condition, hand-placed stone.
Other Obstructions	GC	None.

## PERIODIC INSPECTION CHECK LIST

Page 1 of 2

PROJECT Trap Falls Reservoir Dam

DATE June 8, 1978

PROJECT FEATURE Outlet Works-Control Tower, Operating House, Gate Shafts

AREA EVALUATED	BY	CONDITION
a. Concrete and Structural		
General Condition	PH	Good, considering age 50+ years.
Condition of Joints	PH	No apparent problems.
Spalling	PH	Minor spalling only.
Visible Reinforcing	PH	None apparent.
Rusting or Staining of Concrete	PH	None apparent.
Any Seepage or Efflorescence	PH	None apparent.
Joint Alignment	PH	Good.
Unusual Seepage or Leaks in Gate Chamber	PH	None observed-chamber filled to 1" below spillway.
Cracks	PH	None observed.
Rusting or Corrosion of Steel	PH	Some, nothing major.
b. Mechanical and Electrical		
Air Vents	PH	None.
Float Wells	PH	None.
Crane Hoist	PH	None.
Elevator	PH	None.
Hydraulic System	PH	None.
Service Gates	PH	All gates manually operated.
Emergency Gates	PH	NA.
Lighting Protection System	PH	NA.
Emergency Power System	PH	NA.

## PERIODIC INSPECTION CHECK LIST

Page 1 of 1

PROJECT Trap Falls Reservoir DamDATE June 8, 1978PROJECT FEATURE Reservoir

AREA EVALUATED	BY	CONDITION
Shoreline	PH	Trees and sandy shores.
Sedimentation	PH	None apparent.
Potential Upstream Hazard Areas	PH	None observed.
Watershed Alteration-Runoff Potential	PH	None apparent.

## PERIODIC INSPECTION CHECK LIST

Page 1 of 1

PROJECT Trap Falls Reservoir DamDATE June 8, 1978PROJECT FEATURE Operations and Maintenance

AREA EVALUATED	BY	CONDITION
a. <u>Reservoir Regulation Plan</u>	PH	Mean Brook, Farm Mill, and Housatonic diversions.
Normal Conditions	PH	Reservoir maintained as high as possible; usually is below spillway.
Emergency Plans	PH	No plan-owner has its own security guard. Dam visited at least once a day
Warning System	PH	No formal system.
b. <u>Maintenance (Type) (Regularity)</u>		
Dam	PH	Someone is usually at dam site during day.
Spillway		
Outlet Works	PH	At least once a year, 30 inch blowoff opened and filled for 24 hours, then closed, then opened again for 24 hours

## PERIODIC INSPECTION CHECK LIST

Page 1 of 1

PROJECT Trap Falls Reservoir DamDATE June 8, 1978PROJECT FEATURE Safety and Performance Instrumentation

AREA EVALUATED	BY	CONDITION
Headwater and Tailwater Gages	PH	Daily readings are taken of water level.
Horizontal and Vertical Alignment Instrumentation (Concrete Structures)	PH	None.
Horizontal and Vertical Movement, Consolidation, and Pore-Water Pressure Instrumentation (Embankment Structures)	PH	Horizontal movement is monitored at the left end of spillway.
Uplift Instrumentation	PH	None.
Drainage System Instrumentation	PH	None.
Seismic Instrumentation	PH	None.

APPENDIX  
SECTION B: EXISTING DATA

SPECIAL NOTE

SECTION B

AVAILABILITY OF DATA

The correspondence listed in the Summary of Contents and the plans listed in the Table of Contents, Appendix Section B, are included in the master copy of this report, which is on file at the office of the Army Corps of Engineers, New England Division, in Waltham, Massachusetts.

Only the following correspondence is included in this report.

<u>Date</u>	<u>To</u>	<u>From</u>	<u>Subject</u>	<u>Page</u>
No Date	Bridgeport Hydraulic Company	Hazen and Sawyer, Con- sulting Engineers	Description of Trap Falls Dam	B-1
1975	Files	Bridgeport Hydraulic Company	Plant Inspection B-45 1975	
Nov. 16, 1976	Bridgeport Hydraulic Company	Roald Haestad, Inc., Con- sulting Engineers	1976 Dam Inspection	B-47
1977	Files	Bridgeport Hydraulic Company	Plant Inspection B-51 1977	

SECTION B: EXISTING DATA

SUMMARY OF CONTENTS

<u>DATE</u>	<u>TO</u>	<u>FROM</u>	<u>SUBJECT</u>	<u>PAGE</u>
No Date	Files	Hazen & Sawyer Consulting Engineers	Description of Trapp Falls Dam	B-1
No Date	Files	Bridgeport Hydraulic Co.	Capacity of Reservoir	B-5
No Date	Files	" " "	Trapp Falls Dam Spillway Discharge in MGD	B-6
1959	D.W. Loiselle Supt. of Supply	S. Lovejoy, Sanitary Engineer, B.H.C.	Summer Inspection of Dams	B-7
1960	Files	Bridgeport Hydraulic Co.	Inspection Report 1960	B-10
1963	Files	" " "	Inspection Report 1963	B-11
Apr. 17, 1964	Files	" " "	Trapp Falls Inspection Checklist	B-14
June 11, 1964	Files	Water Resources Commission	Trapp Falls Reservoir Inventory Data	B-15
1965	Files	Bridgeport Hydraulic Co.	Inspection Report 1965	B-17
1966	Files	" " "	Inspection Report 1966	B-20
1967	Files	" " "	Inspection Report 1967	B-22
1968	Files	" " "	Inspection Report 1968	B-25
1969	Files	" " "	Inspection Report 1969	B-29
1970	Files	" " "	Plant Inspection 1970	B-32

<u>DATE</u>	<u>TO</u>	<u>FROM</u>	<u>SUBJECT</u>	<u>PAGE</u>
1971	Files	Bridgeport Hydraulic Co.	Plant Inspection 1971	B-36
1972	Files	" " "	Plant Inspection 1972	B-39
1973	Files	" " "	Plant Inspection 1973	B-42
1975	Files	" " "	Plant Inspection 1975	B-45
Nov. 16, 1976	Bridgeport Hydraulic Co.	Roald Haestad Inc. Consulting Engineers	1976 Dam Inspection	B-46
1977	Files	Bridgeport Hydraulic Co.	Plant Inspection 1977	B-50

**Note:** Correspondence obtained from the State of Connecticut Water Resources Commission and the Bridgeport Hydraulic Company.

Trap Falls Reservoir is the main storage and distribution reservoir for the eastern portion of the Bridgeport Hydraulic Company service area. In addition to surface waters from its own and adjacent watersheds, Trap Falls receives water from the Housatonic well field via Means Brook diversion reservoir and 36 inch pipeline. Approximately 30 percent of the water distributed by Bridgeport Hydraulic Company passes through Trap Falls Reservoir.

As withdrawal rates steadily increased, operating characteristics of the reservoir outlet works became unsatisfactory. Head losses were excessive, and proper cleaning of the screens became an increasing problem, particularly in the Fall when large quantities of leaves are carried into the intake ports. Considering that the Company was well underway in a program to increase both delivery from the Housatonic well field and transmission capacity from Trap Falls Reservoir to Bridgeport, it was obvious that the reservoir's outlet works would have to be improved.

The old outlet works were constructed originally in 1905 and modified in 1916. Four gated inlet ports in a 45-foot deep intake well on the reservoir side of the dam permit the withdrawal of shallow, intermediate or deep water. Two 3/8-inch mesh screens, in the form of half-cylinders with screening on top and bottom, are mounted in a 5-foot by 3-foot opening in the wall dividing intake and outlet wells. Raw water flows via a 30" cast iron outlet pipe through the dam to a Venturi meter and gate house. Chemicals, including Chlorine, Lime and

argon, are injected directly after the meter and further downstream the old 30-inch line is teed into a newly installed 36-inch transmission main.

New criteria set for the outlet works included the following:

- a. - Provide peak flow rate capacity of 40 mgd.
- b. - Provide finer screening to improve water quality, and use an automatic traveling screen to reduce operator's tending time, while maintaining clean screens.
- c. - Provide a connection from the old intake to the new screening facilities to enable drawing water through the existing lower intake ports. This connection is necessary in order to secure cooler water in summer and to avoid frazil ice in the winter, using the traveling screen.

To accomplish the above at minimal expense while maintaining full flow to the distribution system, a new screen well chamber was built between and supported on two buttresses on the downstream face of the dam. This chamber houses a traveling screen supplied by Rex Chain Belt Company; nominal basket width is 7 feet, center-to-center sprocket depth 28 feet, and screen mesh is 1/8 inch. A high pressure spray backwash system is used and automatic indexing of the screen is provided by means of a differential controller. A 48-inch intake

was cut through the dam directly into the reservoir and a new 36" connection carried through the dam from the old to the new intake well. butterfly valves are used in both intake lines. A new 36-inch raw water main runs to the treatment plant and thence ties directly into the newly installed 36-inch transmission main.

A heated head house was constructed over the screen well to shield the screen, controls, operators, etc.; a metal enclosure houses the spray system and screen head machinery. Chemical feed connections, a new Venturi meter and taps for the service water and screen wash water pumps are all in the new 36-inch outlet line and housed in a new basement, first step in the construction of an addition to the existing treatment plant.

Still to be completed are renovations of the old outlet works, including installation of new sluice gates, new butterfly outlet valve, new drain valve and reworking of existing screen guides. The old outlet works will be used for standby service, and also to provide cooler water in summer and warmer water in winter.

A construction schedule was followed which enabled the Company to maintain full flow to the distribution system without constructing temporary outlet facilities. The old intake facilities were used while the new were being constructed, and the new will be used while the old are renovated. (A temporary flange is used to block the interconnection.) Stop logs were used while the 48-inch intake was cut through the dam; the guides eventually will be used

to hold coarse bar racks. Interconnections between the 30-inch and 36-inch service mains, at the treatment plant and further downstream, permitted the use of either while providing for proper dispersion of chemicals.

Consulting engineers for the project are Hazen & Sawyer of New York; prime contractor is E & F Construction Company of Bridgeport.

TRAP FALLS DAM

(PLANT INSPECTIONS - 1975)

General

The dam and spillway appear structurally sound. Maintenance of the area is satisfactory. Following repairs/maintenance are required:

1. Repairs to railing as detailed below.
2. Replace cap on railing near screen chamber.
3. Seal spillway joints.
4. Check design capacity of raceway channel.
5. Clean the lower gatehouse and paint its gate.
6. Repair and paint stairway on the slope of dam. Remove the grass from around the lower stairway.

Inspection was made on November 7, 1975 with the pond down 4.3 ft.

Upper Gatehouse

Excellent condition.

Lower Gatehouse

In good condition. Needs general cleaning of the inside. The old residual recorder and other stored items should be cleared away from the operating area. The door badly needs painting.

Upstream Face of Dam

In good condition. There are very minor areas of exposed aggregate and minor deterioration.

Downstream Face of Dam

No seepage was noticed. Many construction joints are in poor condition and areas of deterioration, spalling and exposed aggregate were found all over the downstream face. Grass should be removed from the steel ladder.

Spillway

Fair condition. Very minor seepage was noticed (pond down about 4.5') on the downstream face. The entire downstream face has exposed aggregate but needs no repairs yet.

On the upstream side face and the crest too, there are areas of deterioration and exposed aggregate.

#### Raceway and Wingwalls

Fairly good condition. On the east wingwall there are several areas with spalling of concrete, cracks and exposed aggregate. Resealing of the large crack in the east wingwall next to the dam should be done. The west wingwall should be repaired at some time in the near future; there are areas of bad deterioration, and spalling of concrete.

The discharging capacity of the raceway seems inadequate. It should be checked hydraulically for design flow over the spillway.

#### Walkway

Good condition. Many areas of deterioration were noticed all over the eastern half - there are several cracks which should be sealed and watched. West half of the walkway is not so bad.

#### Railing

Good condition on the west half. A cap should be fitted on the downstream railing east of the new screen chamber. The first and ninth posts on the downstream railing on the west side are corroded at the bottom and should be repaired or replaced. The third piece from the west end (downstream side) has separated out from the coupling and should be fixed.

On the eastern half, the railing is too loose in several areas - the flanges are not tightly bolted, they are mis-oriented or broken. This condition is dangerous and should be corrected.

#### Coping

Good condition except for some areas of minor deterioration. Two areas on the land side face near the fourth post of the railing need repair at some spots, the reinforcing bars are exposed.

#### New Screen Chamber

In good condition.

1976 DAM INSPECTIONS

Dam inspections were completed by Roald Haestad, Inc., Consulting Engineers. One copy of the Dam Inspections Report is on file in the Operations Department, and a second copy including slides is being retained in the Engineering Department.

TRAP FALLS RESERVOIR DAM

Statistical Information from "INVENTORY OF DAMS IN THE UNITED STATES" prepared by the Department of the Army, Office of the Chief of Engineers, 1975.

ID NO: CT91 HAZARD POTENTIAL: \*  
COUNTY: Fairfield RIVER OR STREAM: Pumpkin Ground Brook  
TYPE: Earth Buttress HEIGHT: 41 FEET  
MAXIMUM CAPACITY: 7,280 ACRE FEET  
NEAREST DOWNSTREAM CITY/TOWN/VILLAGE: Stratford  
POPULATION: 50,300 DISTANCE FROM DAM: 3 MILES  
YEAR COMPLETED: 1905

\*Unreported

BRIDGEPORT HYDRAULIC COMPANY RECORDS

HEIGHT: 87 FEET  
CAPACITY: 7,172 ACRE FEET  
2,337 MILLION GALLONS

RATINGS:  
(Based on Guidelines and using BHCo Records)  
HAZARD POTENTIAL RATING: High  
SIZE RATING: Intermediate  
RECOMMENDED SPILLWAY DESIGN FLOOD: PMF

ROALD HAESTAD, INC.

INSPECTION DATE:

November 16, 1976

ROALD HAESTAD, INC:

Roald Haestad

Ronald Litke

BRIDGEPORT HYDRAULIC CO:

Kenneth Logan

COMMENTS

Trap Falls Reservoir:

The reservoir is down about six feet. The upstream face looks pretty good as far as we can see from the east end of the dam. There is a dip in the terrain about 150 feet or so to the east of the end of the concrete dam. Looks like natural ground and might be checked for free board.

At the gate house, we have the same electrical service connection again. There is one run with 2 single conductors and one run with 3 single conductors. The exposed wires are low enough to walk into and are a hazard to personnel. Gate house roof needs some maintenance. Railings on top of dam seem to be in good shape. The slab on the top of the dam on the eastern edge of the ogee section has cracked and has been repaired. This should be watched for additional movement. There seems to be very little cross section on the top of the dam to take care of ice loading. The very westerly end of the ogee section is into ledge. The Concrete is somewhat worn but it doesn't look too bad at all. We can see that there is some lifting taking place on the retaining wall downstream from the east end of the spillway between the rock and the bottom of the wall. Matter of fact, that entire wall has been undermined and should be filled in - think we are have some frost lifting on it. There is leakage from the other side which freezes - it is going to be difficult to have that sealed. The water pressure has to be relieved from behind the wall.

Trap Falls Reservoir (continued)

November 16, 1976

Lime is dumped in little piles here and there over the wall at the lower end of the spillway channel and should be cleaned. No unusual wet spots below the dam that we can see, with the lake down six feet.

TRAP FALLS DAM  
PLANT INSPECTION 1977

General

The dam and spillway appear structurally sound. However, there are many places on the dam where deterioration of the concrete has occurred. The area around the dam appears to be maintained satisfactorily.

Inspection was made on December 23, 1977 with the reservoir down 3.4 feet.

Upper Gatehouse

The upper gatehouse is generally in good condition. There is some clutter inside that should be straightened up. A number of loose tiles were observed on the roof. These should be repaired before more damage occurs.

New Screen Chamber

This is in good condition.

Lower Gatehouse

The lower gatehouse is generally in good condition. It is being used for miscellaneous storage. Water on the floor was observed. The source of the water was not determined.

Spillway

Although there is some minor seepage and exposed aggregate, the spillway appears to be in fair condition.

Raceway and Wingwalls

These appear to be structurally sound. However, there are a number of locations where the concrete has deteriorated. The wingwall at the west end of the spillway is badly deteriorated and should be repaired.

Walkway and Coping

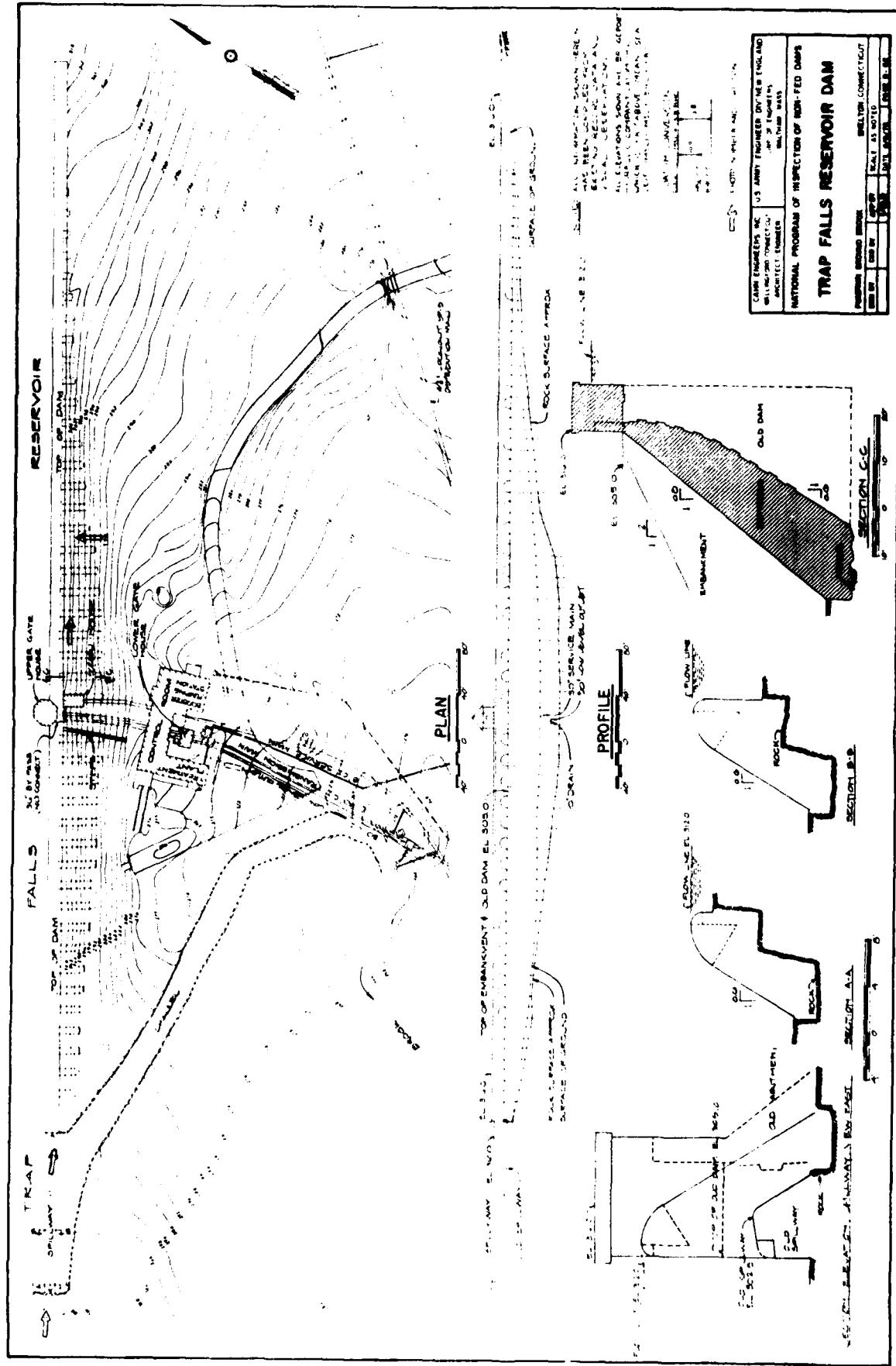
The walkway and coping are generally in good condition except for some areas of minor deterioration. These should be repaired to prevent further deterioration. The railing on the eastern end of the dam should be more rigid in places although there is no immediate danger.

#### Upstream Face of Dam

The upstream face of the dam is generally in good condition although some exposed aggregate and minor deterioration was observed.

#### Downstream Face of Dam

The earthen embankment buttressing the dam appears to be in good condition. No seepage was observed along it. The concrete section exposed along the top of the dam is in poor condition but appears to be structurally sound. Most of the vertical joints are badly deteriorated at the face of the dam. Reinforcing bars are even exposed at some joints. Corrective action should be taken soon so that serious structural damage does not occur.



**APPENDIX**  
**SECTION C: DETAIL PHOTOGRAPHS**



PHOTO NO.1 - General view of spillway and channel with downstream facilities in background.



PHOTO NO.2 - Spillway deterioration and cracking of channel retaining wall.

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	TRAP FALLS RESERVOIR DAM PUMPKIN GROUND BROOK
CAHN ENGINEERS INC. WALLINGFORD, CONN. ARCHITECT — ENGINEER		SHELTON, CONNECTICUT CE# 27 531 GI DATE 6/8/78 PAGE C-1



PHOTO NO.3 - Spalling and efflorescence at downstream face of dam.



PHOTO NO.4 - General view of downstream embankment. Note area of localized minor sloughing.

US ARMY ENGINEER DIV. NEW ENGLAND  
CORPS OF ENGINEERS  
WALTHAM, MASS.

CANN ENGINEERS INC.  
WALLINGFORD, CONN.  
ARCHITECT — ENGINEER

NATIONAL PROGRAM OF  
INSPECTION OF  
NON-FED. DAMS

TRAP FALLS RESERVOIR DAM  
PUMPKIN GROUND BROOK  
SHELTON, CONNECTICUT  
CES 27 531 GI  
DATE 6/8/78 PAGE C-2

**APPENDIX**  
**SECTION D: HYDRAULIC/HYDROLOGIC COMPUTATIONS**

**PRELIMINARY GUIDANCE  
FOR ESTIMATING  
MAXIMUM PROBABLE DISCHARGES  
IN  
PHASE I DAM SAFETY  
INVESTIGATIONS**

**New England Division  
Corps of Engineers**

**March 1978**

MAXIMUM PROBABLE FLOOD INFLOWS  
NED RESERVOIRS

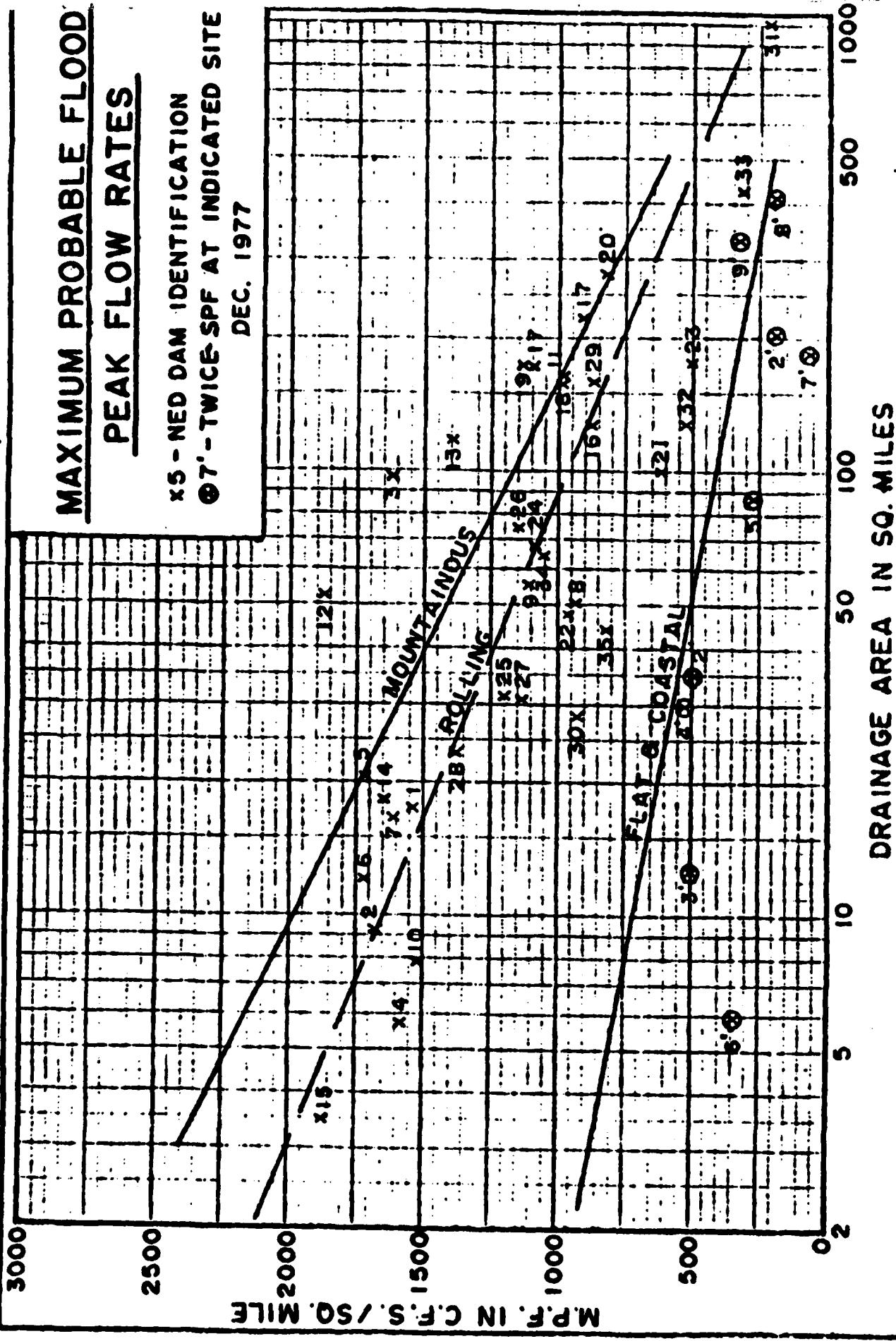
<u>Project</u>	<u>Q</u> (cfs)	<u>D.A.</u> (sq. mi.)	<u>MPF</u> cfs/sq. mi.
1. Hall Meadow Brook	26,600	17.2	
2. East Branch	15,500	9.25	1,546
3. Thomaston	158,000	97.2	1,675
4. Northfield Brook	9,000	5.7	1,625
5. Black Rock	35,000	20.4	1,580
6. Hancock Brook	20,700	12.0	1,725
7. Hop Brook	26,400	16.4	1,610
8. Tully	47,000	50.0	940
9. Barre Falls	61,000	55.0	
10. Conant Brook	11,900	7.8	1,109
11. Knightville			1,525
12. Littleville	160,000	162.0	
13. Colebrook River	98,000	52.3	987
14. Mad River	165,000	118.0	1,870
15. Sucker Brook	30,000	18.2	1,400
	6,500	3.43	1,650
16. Union Village	110,000	126.0	
17. North Hartland	199,000	220.0	873
18. North Springfield	157,000	158.0	904
19. Ball Mountain	190,000	172.0	994
20. Townshend	228,000	106.0(278 total)	1,105
			820
21. Surry Mountain	63,000	100.0	
22. Otter Brook	45,000	47.0	630
23. Birch Hill	88,500	175.0	957
24. East Brimfield	73,900	67.5	505
25. Westville	38,400	99.5(32 net)	1,095
			1,200
26. West Thompson	85,000		
27. Hodges Village	35,600	173.5(74 net)	1,150
28. Buffumville	36,500	31.1	1,145
29. Mansfield Hollow	125,000	26.5	1,377
30. West Hill	26,000	159.0	786
			928
31. Franklin Falls	210,000	1000.0	
32. Blackwater	66,500	128.0	210
33. Hopkinton	135,000	426.0	520
34. Everett	68,000	64.0	316
35. MacDowell	36,300	44.0	1,062
			825

MAXIMUM PROBABLE FLOWS  
BASED ON TWICE THE  
STANDARD PROJECT FLOOD  
(Flat and Coastal Areas)

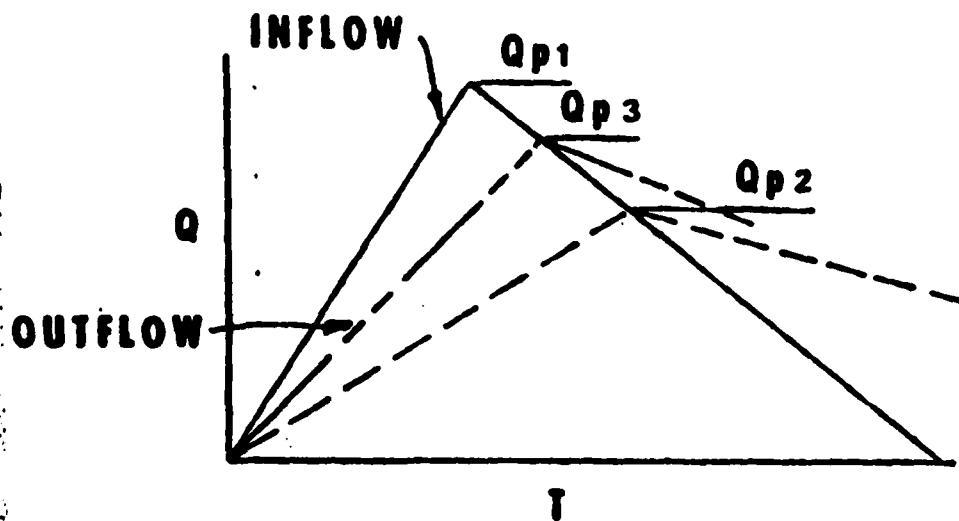
<u>River</u>	<u>SPF</u> (cfs)	<u>D.A.</u> (sq. mi.)	<u>MPF</u> (cfs/sq. mi.)
1. Pawtuxet River	19,000	200	190
2. Mill River (R.I.)	8,500	34	500
3. Peters River (R.I.)	3,200	13	490
4. Kettle Brook	8,000	30	530
5. Sudbury River.	11,700	86	270
6. Indian Brook (Hopk.)	1,000	5.9	340
7. Charles River.	6,000	184	65
8. Blackstone River.	43,000	416	200
9. Quinebaug River	55,000	331	330

## MAXIMUM PROBABLE FLOOD PEAK FLOW RATES

X5 - NED DAM IDENTIFICATION  
@ 7' - TWICE SPF AT INDICATED SITE  
DEC 1977



## ESTIMATING EFFECT OF SURCHARGE STORAGE ON MAXIMUM PROBABLE DISCHARGES



**STEP 1: Determine Peak Inflow (Qp1) from Guide Curves.**

**STEP 2: a. Determine Surcharge Height To Pass "Qp1".**

**b. Determine Volume of Surcharge (STOR1) In Inches of Runoff.**

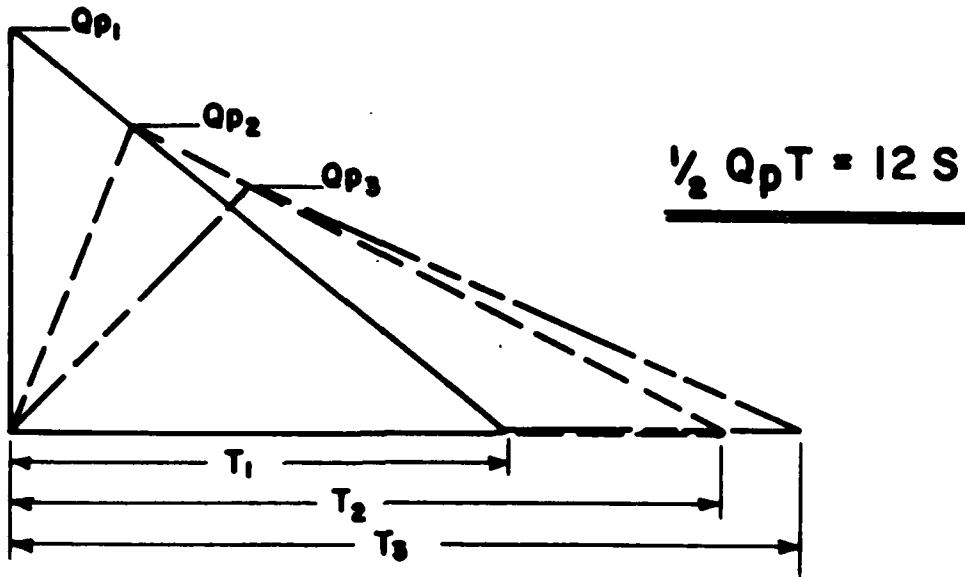
**c. Maximum Probable Flood Runoff In New England equals Approx. 19", Therefore**

$$Qp2 = Qp1 \times \left(1 - \frac{STOR1}{19}\right)$$

**STEP 3: a. Determine Surcharge Height and "STOR2" To Pass "Qp2"**

**b. Average "STOR1" and "STOR2" and Determine Average Surcharge and Resulting Peak Outflow "Qp3".**

# **"RULE OF THUMB" GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS**



**STEP 1:** DETERMINE OR ESTIMATE RESERVOIR STORAGE (S) IN AC-FT AT TIME OF FAILURE.

**STEP 2:** DETERMINE PEAK FAILURE OUTFLOW ( $Q_{p1}$ ).

$$Q_{p1} = \frac{8}{27} w_b \sqrt{g} Y_0^{\frac{3}{2}}$$

$w_b$  = BREACH WIDTH - SUGGEST VALUE NOT GREATER THAN 40% OF DAM LENGTH ACROSS RIVER AT MID HEIGHT.

$Y_0$  = TOTAL HEIGHT FROM RIVER BED TO POOL LEVEL AT FAILURE.

**STEP 3:** USING USGS TOPO OR OTHER DATA, DEVELOP REPRESENTATIVE STAGE-DISCHARGE RATING FOR SELECTED DOWNSTREAM RIVER REACH.

**STEP 4:** ESTIMATE REACH OUTFLOW ( $Q_{p2}$ ) USING FOLLOWING ITERATION.

A. APPLY  $Q_{p1}$  TO STAGE RATING, DETERMINE STAGE AND ACCOMPANYING VOLUME ( $V_1$ ) IN REACH IN AC-FT. (NOTE: IF  $V_1$  EXCEEDS 1/2 OF S, SELECT SHORTER REACH.)

B. DETERMINE TRIAL  $Q_{p2}$ .

$$Q_{p2}(\text{TRIAL}) = Q_{p1} \left(1 - \frac{V_1}{S}\right)$$

C. COMPUTE  $V_2$  USING  $Q_{p2}$  (TRIAL).

D. AVERAGE  $V_1$  AND  $V_2$  AND COMPUTE  $Q_{p2}$ .

$$Q_{p2} = Q_{p1} \left(1 - \frac{V_1 + V_2}{2S}\right)$$

**STEP 5:** FOR SUCCEEDING REACHES REPEAT STEPS 3 AND 4.

APRIL 1978

Project INSPECTION OF NON-FEDERAL DAMS IN NEW ENGLAND  
 Computed By D. SHEN Checked By Hill  
 Job Book Ref. C.E. # 27-531-61 Other Refs. C.E. # 27-531-61

Sheet 1 of 4  
 Date 5/18/1978  
 Revisions

### HYDROLOGIC/HYDRAULIC INSPECTION

TRAP FALLS RESERVOIR DAM, STRATFORD, CONNECTICUT

#### (1) MAXIMUM PROBABLE FLOOD - PEAK FLOW RATE

(a) WATERSHED ASSUMED TO BE "ROLLING TYPE".

USE MPF GUIDE CURVES FURNISHED BY  
 THE ACE, NEW ENGLAND DIV OFFICE. FOR DETERMINATION  
 OF MPF "ROLLING" CURVE IS USED

(b) WATERSHED AREA:  $DA = 1.12 \text{ SQ. MI}$  (AS MEASURED BY C.E.)  
 CONNECTICUT WATER RESOURCES BULLETIN NO 19, 1974 -  $DA = 1.09 \text{ SQ. MI}$

(c) FROM GUIDE CURVE (EXTRAPOLATION)

$$M.P.F \approx 2,300 \text{ CFS/SQ. MI}$$

(d)  $M.P.F = \text{PEAK INFLOW}$

$$Q = 2,300 \times 1.12 \approx 2,600 \text{ CFS}$$

#### (2) SPILLWAY DESIGN FLOW (SDF)

(a) CLASSIFICATION OF DAM ACCORDING TO ACE RECOMMENDED  
 GUIDELINES.

(i) S12B (IMPOUNDMENT).  $\text{STORAGE (MAX)} = 8,500 \text{ AC-FT}$   
 $(\text{CINTBAM})$

(2)  $\text{HEIGHT (STRUCT)} = 45 \text{ FT}$   
 $(\text{CINTBAM})$

THE TRAP FALLS RESERVOIR DAM WILL BE CLASSIFIED AS "INTERMEDIATE".

(1) FROM BRIDGEPORT HYDRAULIC CO. RECORDS - RESERVOIR CAPA. AT FLOWLINE (ELEV. 315.8 MSL)  
 IS 2337 MG E 71/2 AC-FT. AREA AT FLOWLINE = 344 AC. (CONN. WATER RESOURCES BULLETIN NO 19, 1974)  
 (C.E. MEASURE = 347 AC.). FREEBOARD: SPILLWAY CREST (ELEV. 315.8 MSL) TO TOP OF DAM (ELEV. 319.8  
 IS 4'. ADDITIONAL STORAGE TO TOP OF DAM  $\approx 350 \times 4 = 1400 \text{ AC-FT}$   
 MAX. STORAGE  $\approx 71/2 + 1400 = 8512 \text{ SFT. } 8500 \text{ AC-FT. (U.S. INVENTORY OF DAMS, 3/10/78 P13}$   
 SHOWS 7280 AC-FT. SEE NOTE AFTER 2000 P. 2.

(2) FROM BRIDGEPORT HYDRAULIC CO. TRAP FALLS DAM GENERAL PLAN & PROFILE DWG. JUNE 1976.

Project INSPECTION OF NON-FEDERAL DAMS IN NEW ENGLAND Sheet 2 of 4  
Computed By D. SHBN Checked By W.H.  
Field Book Ref. CE# 27-531-G3 Other Refs.   
Date 5/18/1978  
Revisions

### HYDROLOGIC/HYDRAULIC INSPECTION TRAP FALLS RESERVOIR, STRATFORD, CONNECTICUT

(2) (a) (CONT'D)-

#### SDF - CLASSIFICATION OF DAM

##### (i) HAZARD POTENTIAL:

THE DAM IS U/S OF INDUSTRIAL BLOCKS, & HOUSING DEVELOPMENTS, RTE 8 AND URBAN AREAS OF STRATFORD.

THEFORE, IT IS CLASSIFIED AS OF "HIGH" HAZARD POTENTIAL

##### (ii) SDF

ACCORDING TO ACE RECOMMENDED GUIDELINES FOR THIS DAM THE SDF SHOULD BE THE M.P.F.

$$SDF = M.P.F. = \underline{2600 \text{ CFS}}$$

\* NOTE: BRIDGEPORT HYDRAULIC CO. DATA GIVES ELEVATIONS IN BRIDGEPORT HYDRAULIC CO. DATA MSL (USCGS DATHM) = B.H.C. + 3.80'

#### (3) EFFECT OF SURCHARGE STORAGE ON MAXIMUM PROBABLE DISCHARGES

##### (a) PEAK INFLOW (SDF = M.P.F.)

$$Q_{P1} = 2600 \text{ CFS}$$

NOTE: ESTIMATION WAS MADE IN ACCORDANCE WITHIN PROCEDURES OUTLINED IN ACE - NEW ENGLAND DIV GUIDELINE SHEETS.

Project INSPECTION OF NON-FEDERAL DAM IN NEW JERSEY  
 Computed By D.Sher Checked By W.L.  
 Field Book Ref. Other Refs. 27-531-G1

Sheet 3 of 4  
 Date 5/18/1978  
 Revisions \_\_\_\_\_

HYDROLOGY / HYDRAULIC INSPECTION  
 TRAP FALLS RESERVOIR, STRATFORD, CONNECTICUT

(b) (CONT'D)- EFFECT OF SURCHARGE STORAGE ON MPP's

(b) SURCHARGE HEIGHT TO PFS: Q<sub>P</sub>

$$C = 3.9$$

L = 139' (BRIDGEPORT HYDRAULIC CO. Datas June 1971)

$$Q = 580 H^{3/2}$$

$$\therefore H = \left(\frac{Q}{580}\right)^{2/3}$$

$$\therefore Q_{P1} = 2600 \text{ CFS}$$

$$H_1 = 2.9'$$

FREEBOARD OF SPILLWAY CREST TO TOP OF DAM IS 4'  
 THEREFORE, THE SPILLWAY IS ADEQUATE FOR Q<sub>P1</sub> = 2600 CFS

SPILLWAY CAPACITY AT H=4', Q = 4300 CFS

(c) ESTIMATE EFFECT OF RESERVOIR STORAGE ON PEAK OUTFLOW.

ASSUME NORMAL POOL LEVEL TO BE 0.5 FT  
 ABOVE THE SPILLWAY CREST

AREA AT FLOWLINE = 340 AC

∴ VOL. OF SURCHARGE:

$$344 \times (2.9 - 0.5) = 830 \text{ ac ft}$$

$$DA = 1.12 \text{ SQ. MI.}$$

$$S_1 = \frac{830}{1.12 \times 433} = 14''$$

Project INSPECTION OF NON-FEDERAL DAMS IN NEW ENGLAND  
 Computed By D. SHEN Checked By WY  
 Field Book Ref. FE#27-431-93

Sheet 4 of 4  
 Date 5/18/1978  
 Revisions       

### HYDROLOGY / HYDRAULIC INSPECTION

TRAP FALLS RESERVOIR, STRATFORD, CONNECTICUT

(3) (CONT'D) EFFECT OF SURCHARGE STORAGE ON MFD'S

(d) PEAK OUTFLOW FOR SURCHARGE S,

NOTE: (GUIDELINE FOR ASSUMING A TRIANGULAR HYDROGRAPH AND MFD RUNOFF IN N.ENG. IS  $\pm 18''$ )

$$Q_{P2} = Q_{P1} \left(1 - \frac{S_1}{18}\right)$$

$$Q_{P2} = 2600 \left(1 - \frac{14}{18}\right)$$

$$= 680 \text{ C.F.S}$$

FOR  $Q_{P2} = 680 \text{ CFS}$

$$H_2 \approx 1.2'$$

$$S_2 \approx 4.0''$$

$$S_{AVE} = 9.0''$$

(e) RESULTING PEAK OUTFLOW

$$Q_{P3} = 2600 \left(1 - \frac{9}{18}\right)$$

$$Q_{P3} = 1400 \text{ CFS}$$

$$H_3 \approx 1.9' \text{ SAY } 2.0'$$

f. SUMMARY: PEAK INFLOW  $Q_{P1} = MFD = 2600 \text{ CFS}$   
 PEAK OUTFLOW  $Q_{P3} = 1400 \text{ CFS}$

AVERAGE SURCHARGE HEIGHT = 2.0' ABOVE  
 THE SPILLWAY CREST. OR TO ELEV  $\pm 318'$  MSL  
 TOP OF DAM HAS AN ELEV. OF  $\pm 319.8'$  MSL.

\* BACKWATER MAY CAUSE SOME FLOODING ALONG HUNTINGTON ST.  
 TO THE N.E. OF THE RESERVOIR.

Project INSPECTION OF NON-FEDERAL DAMS IN NEW ENGLAND  
 Computed By D. SHEN Checked By WIL  
 Field Book Ref. Other Refs. CEN 27-531-GI

Sheet 1 of 4  
 Date 5/30/1978  
 Revisions

### HYDROLOGIC / HYDRAULIC INSPECTION

TRAP FALLS RESERVOIR, STRATFORD, CT.

DOWNSTREAM DAM FAILURE HAZARD

(1) ESTIMATE OF DOWNSTREAM DAM FAILURE HYDROGRAPH  
 (SEE ACE "RULE OF THUMB" GUIDELINE FOR DETERMINING  
 THE HYDROGRAPH)

(a) ESTIMATE OF RESERVOIR STORAGE AT TIME OF FAILURE.  
 (SEE D. SHEN COMPS. 5/18/78)

(i) MAXIMUM STORAGE CAPACITY  
 8500 AC-FT

(ii) HEIGHT OF DAM ABOVE SPILLWAY  
 4 FT

(iii) AREA AT FLOWLINE  
 344 AC.

(iv) HEIGHT OF MAXIMUM POOL  
 (FROM I ELEV. 275' MSL TO I ELEV. 318' MSL)  
 ≈ 43 FT.

(v) ESTIMATE VOLUME OF RESERVOIR STORAGE AT TIME OF FAILURE

SURCHARGE ELEVATION ≈ 318.0' ≈ 2.0' ABOVE THE SPILLWAY CREST.

$$S \approx 8,500 + 2 \times (344) = 9,188 \text{ AC-FT}$$

$$\text{SAY } S = \underline{\underline{9,200 \text{ AC-FT}}}, \frac{S}{2} = \underline{\underline{4,600 \text{ AC-FT}}}$$

Project INSPECTION OF NON-FEDERAL DAMS IN NEW ENGLAND  
 Computed By D. SHEN Checked By JHM  
 Field Book Ref. Other Refs. LE 27-531-67

Sheet 1 of 4  
 Date 5/31/1978  
 Revisions

### HYDROLOGIC / HYDRAULIC INSPECTION

TRAP FALLS RESERVOIR STRATFORD, CONN

DOWNSTREAM DAM FAILURE HAZARD

(1) (contd) Estimate of downstream dam failure hydrograph

(b) PEAK FAILURE OUTFLOW  $Q_p$ ,

i. BREACH WIDTH

ESTIMATE MADE ACCORDING TO "GENERAL PLAN AND PROFILE OF TRAP FALLS DAM", BRIDGEPORT HYDRAULIC CO. JUNE 1916

TOTAL LENGTH OF DAM  $\approx 1080$  FT

TOTAL LENGTH OF DAM AT MID-HEIGHT ( $\pm$  ELEV 299' NSL)  $\approx \pm 680$  FT.

$$\therefore W = 0.4 \times 680 = 272'$$

TAKE  $W_b \approx \underline{270'}$  (BREACH WIDTH)

(ii) TOTAL HEIGHT AT TIME OF FAILURE

$$y_0 = \underline{43'}$$

APPROXIMATE DEPTH OF WATER AT IMMEDIATE IMPACT AREA

$$y \approx 0.44 y_0$$

$$\therefore y \approx 0.44(43') \approx \underline{19'}$$

(iii) PEAK FAILURE OUTFLOW:

$$Q_p = \frac{P}{27} W_b \sqrt{g} y_0^{1.5} \approx \underline{128,000 \text{ CFS}}$$

Project INSPECTION OF NON-FEDERAL DAMS IN NEW ENGLAND  
 Computed By D. SHEN Checked By J.W.  
 Field Book Ref. Other Refs. CE#27-531-67

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 Date 6/5/1970  
 Revisions \_\_\_\_\_

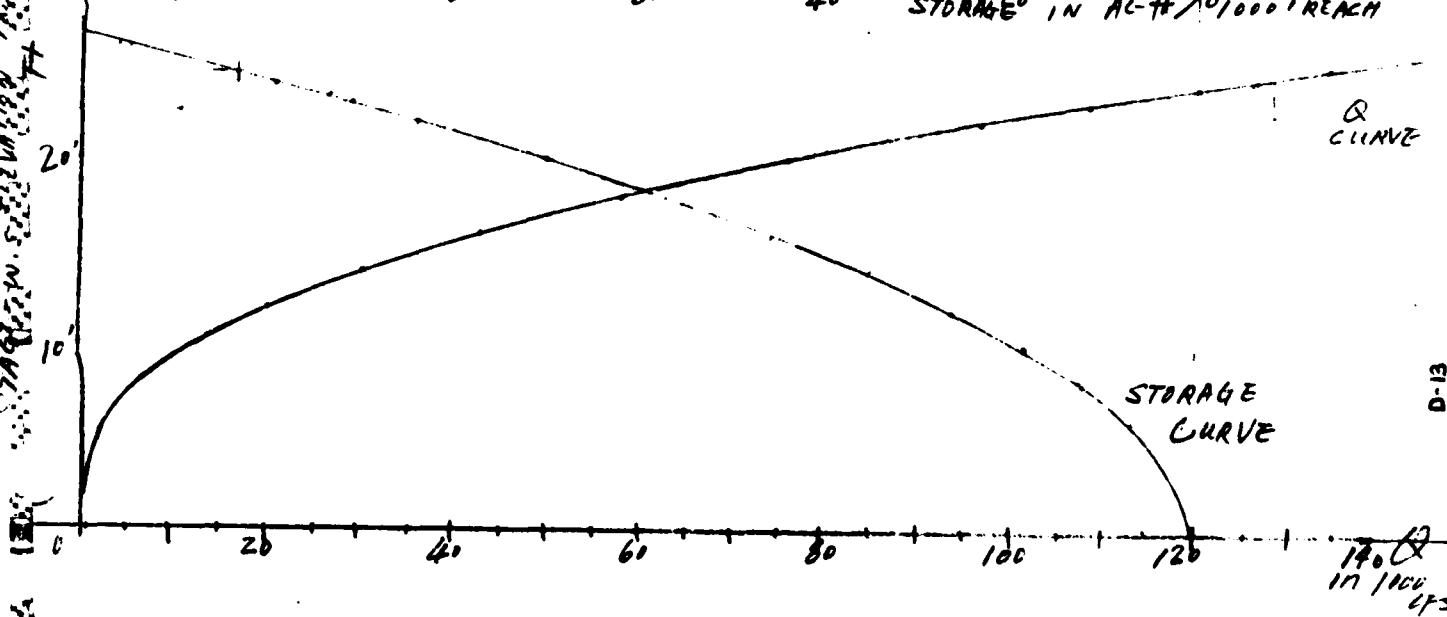
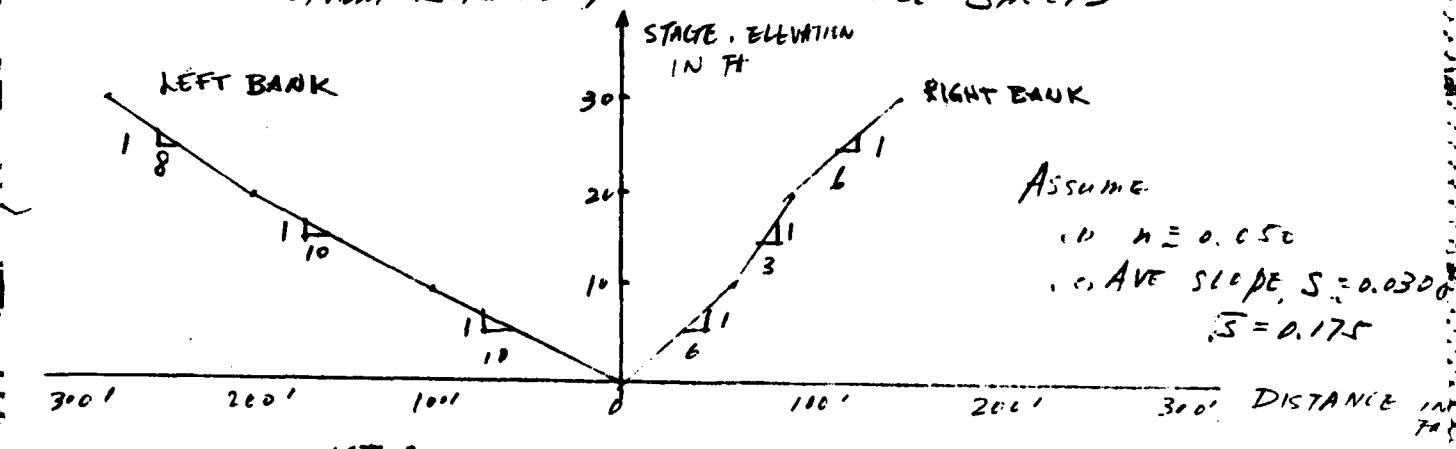
### HYDROLOGIC / HYDRAULIC INSPECTION

TRAP FALLS RESERVOIR STRATFORD, CT

DOWNSTREAM DAM FAILURE HAZARD

(D) (cont'd) ESTIMATE OF DOWNSTREAM DAM FAILURE HYDROGRAPH

(E) TYPICAL D/S CROSS-SECTION AND RATING CURVES  
 (FROM USGS LONG HILL QUADRANGLE SHEET)



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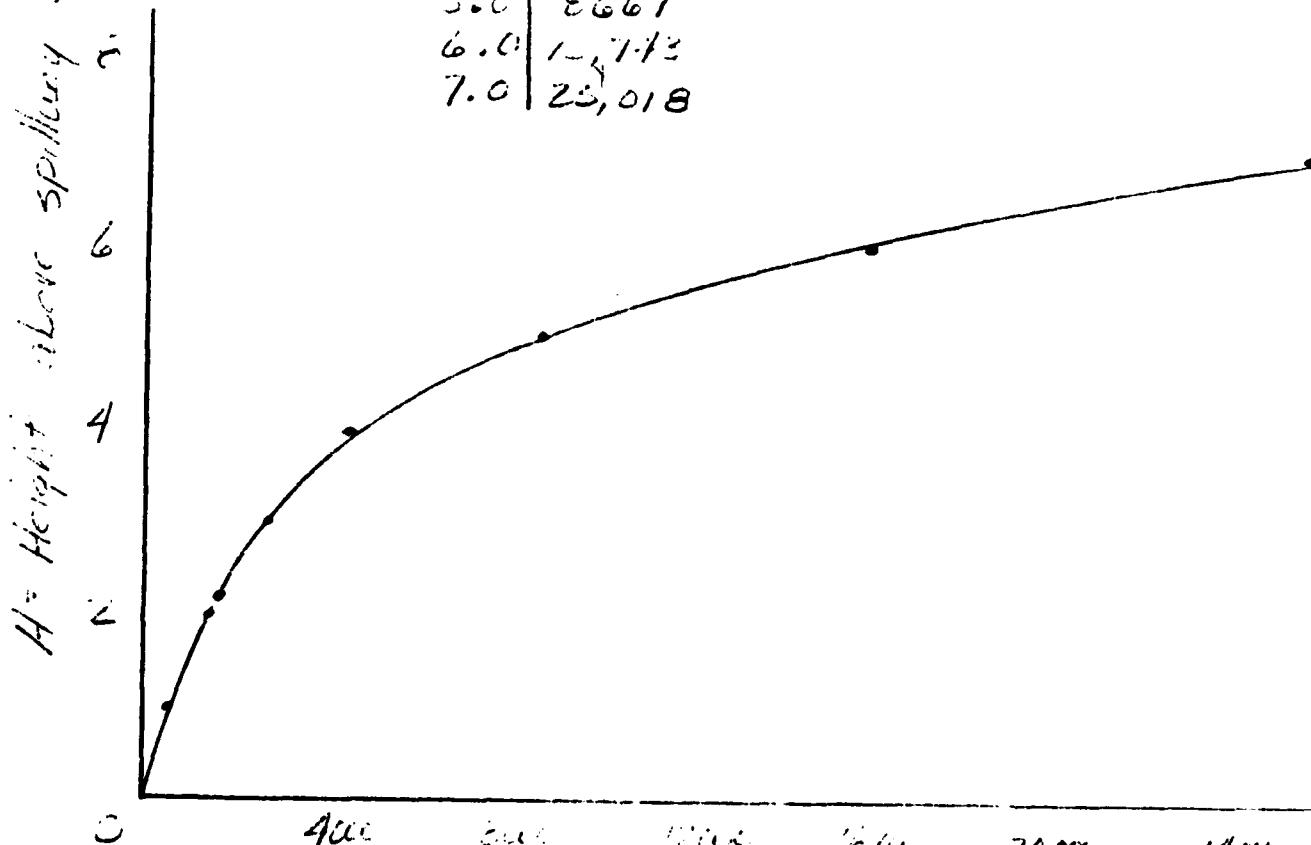
Project 1200' TALL RIVER DAM  
 Computed By HMC/CRG Checked By \_\_\_\_\_  
 Field Book Ref. \_\_\_\_\_ Other Refs. \_\_\_\_\_

Sheet 1 of 1  
 Date 11-17-72  
 Revisions \_\_\_\_\_

HILLMAN TUNNEL OPEN

$$Q = 540 H^{3/2} + 2500(H-4)^{3/2} + 130(H-4)^{5/2}$$

<u><math>H(FT)</math></u>	<u><math>Q(FT^3/SEC)</math></u>
1.0	540
2.0	1527
2.2	1762
3.0	2802
4.0	4320
5.0	8667
6.0	17133
7.0	25018



$$Q = \text{Flow (cfs)}$$

Project INSPECTION OF NON-FEDERAL DAMS IN NEW YORK STATE  
 Computed By D. SHEN Checked By W.W.  
 Field Book Ref. CE 421-531-73 Other Refs. CE 421-531-73

Sheet 4 of 4  
 Date 6/1/1978  
 Revisions 1

### HYDROLOGIC / HYDRAULIC INSPECTION

TRAP FALLS RESERVOIR STRATFORD, CT

DOWNTSTREAM DAM FAILURE HAZARD

(a) (CONT'D) ESTIMATE OF D/S DAM FAILURE HYDROGRAPH

(b) PEAK REACH OUTFLOW  $Q_p$

(i)  $Q_p = 128,000 \text{ cfs}$ . STAGE  $\approx 24.5'$   
 VOLUME IN REACH

$$V_1 = 103 \times 1.7 = 175 \text{ ac-ft} < \frac{S}{2} \text{ ac-ft}$$

(ii) PEAK REACH OUTFLOW  $Q_p$ :

$Q_p$  (TRAIL)

$$Q_p = Q_p \left(1 - \frac{V_1}{S}\right) = 128,000 \left(1 - \frac{175}{9200}\right) = 126,000 \text{ cfs}$$

(iii)  $Q_p = 126,000 \text{ cfs}$ . STAGE  $\approx 24.2'$   
 VOLUME IN REACH.  $V_2 = 101 \times 1.7 = 172 \text{ ac-ft}$

(iv) AVE. STORAGE IN REACH:  $173 \text{ ac-ft}$ .

$$Q_p = 126,000 \text{ cfs}$$

$$\text{STAGE} \approx 24.2' \text{ SAY } 24'$$

(e) SUMMARY:

PEAK FAILURE OUTFLOW:  $128,000 \text{ cfs}$   
 PEAK REACH OUTFLOW:  $126,000 \text{ cfs}$   
 AVE. STAGE IN D/S REACH:  $24 \text{ ft}$

Project INSPECTION OF NON-FEDERAL DAMS IN NEW ENGLAND  
 Computed By Hull Checked By J. Shen  
 Field Book Ref. CE#31-531-65 Other Refs. \_\_\_\_\_

Sheet 1 of 3  
 Date 7/11/78  
 Revisions \_\_\_\_\_

### HYDROLOGIC/HYDRAULIC INSPECTION

#### TRAP FALLS RESERVOIR, STRATFORD, CT.

1A) MPF ESTIMATE FROM HIGH INTENSITY RAINFALL PERIOD OF A SHORT DURATION STORM IN A SMALL WATERSHED.

THIS PARALLEL COMPUTATION IS MADE CONSIDERING THAT FOR SMALL DRAINAGE AREAS USE BY EXTRAPOLATION OF THE MPF GUIDE CURVES FURNISHED BY THE ACE, NEW ENGLAND DIVISION, MAY GIVE PEAK RUN-OFFS OF LESSER MAGNITUDE THAN THOSE WHICH COULD PROBABLY OCCUR.

ASSUME FOR TRAP FALLS A TIME OF CONCENTRATION OF ABOUT 30 MINUTES, IN THE HIGH INTENSITY RAINFALL PERIOD OF A 6-HR RAINFALL, FOR ESTIMATING THE MAX. PROBABLE RUN-OFF.

a) 6-HR PMP AT TRAP FALLS:  $PMP = 24.5" (10 \text{ sq mi}, \text{ft. base})$

(FROM USBR "DESIGN OF SMALL DAMS" - FIG. 1, p. 29 BASED ON HYDROMeteorological REPORT NO. 53 - U.S. WEATHER BUREAU / U.S. CORPS OF ENGINEERS)

b) ASSUME MOST INTENSE 30 MIN. PERIOD RAINFALL  $\approx 40\%$  OF THE TOTAL 6-HR RAINFALL (USACE 43% - USBR/CS 37%)

$\therefore PMP \text{ FOR } 30 \text{ MIN. PERIOD} \approx 9.8" (i = 19.6" / \text{hr})$

c) ASSUME PHF FOR THIS <sup>#</sup>D.A.  $\approx 70\%$  OF THE ABOVE PMP OR,

$PHF = 13.7" / \text{hr} \therefore Q_p = 1.12 \times 13.7 \times 645.3 = \underline{9100 \text{ cfs}}$

<sup>15</sup>  
 NOTE: THIS CORRESPONDS TO USE OF HANNAGH CURVES WITH C = 0.70 TO 0.71

Project INSPECTION OF NON-FEDERAL DAMS IN NEW ENGLAND  
 Computed By ME Checked By D.SHEA  
 Field Book Ref. CEP 27-531-62 Other Refs.

Sheet 2 of 13  
 Date 7/11/78  
 Revisions

### HYDROLOGIC/HYDRAULIC INSPECTION

#### TRAY FALLS RESERVOIR, STRATFORD, CT.

2A) THE DAM IS CLASSIFIED OF INTERMEDIATE SIZE WITH HIGH HAZARD POTENTIAL

∴ SDF RECOMMENDED BY GUIDELINES = PMF = 9900 cfs (PEAK INFLOW)

3A) EFFECT OF SURCHARGE STORAGE ON MAX. PROVABLE DISCHARGE

a) FOR  $Q_p = 9900 \text{ cfs}$

STILLWATER CAPACITY (MAX.) =  $4300 \text{ cfs}$  (SEE D.SHEA COMPS 5/18/78 p. 3)

SO, AT  $Q = Q_p = 9900 \text{ cfs}$  THE DAM WILL BE OVERTOPPED.

ASSUMING  $C = 2.7 \text{ ft.}$  : THE FLOW OVER THE MAIN DAM ( $L = 990 \text{ ft.}$ ) AND SIDE SPILLS (RAISING 10' IN 700') WITH AN EQ. LENGTH OF  $L = \frac{2}{3} \times \left(\frac{700}{10}\right)(H-4)$

$$Q = 540H^{3/2} + 2500(H-4)^{3/2} + 130(H-4)^{5/2}$$

∴ FOR  $Q_p = 9900 \text{ cfs}$   $H = 5.2'$

b) VOLUME OF SURCHARGE @  $H_1 = 5.2'$  (NORMAL POOL ASSUMED 9.5' ABOVE CREST OF SPILLWAY - SEE D.SHEA COMPS 5/18/78 p. 3)

$$V_1 = 304(5.2 - 0.5) = 1600 \text{ AC-FT}$$

$$\therefore S_1 = \frac{1600}{1.12 \times 53.3} = 27" > 15.8" \text{ (SEE BELOW)}$$

c) ASSUMING THE MPF FLOOD R.O. IN NEW ENGLAND (GUIDELINES) TO BE APPROX. EQUAL  $\rightarrow 19"$ , AND THE MAX. R.O. IN 6-MIN TO BE 83% OF THE 24-HR R.O., OR,  $15.8"$ , THE PEAK OUTFLOW AREA BEG

Project INSPECTION OF NON-FEDERAL DAMS SIX NEW ENGLAND  
 Computed By Hill Checked By J. Sher  
 Field Book Ref. Other Refs. CE #27-531-67

Sheet 3 of 3  
 Date 7/11/78  
 Revisions \_\_\_\_\_

### HYDROLOGIC/HYDRAULIC INSPECTION

TRAP FALLS RESERVOIR, STREATOR, IL.

3A, C - (cont'd). PEAK OUTFLOW ESTIMATE.

ESTIMATED AS FOLLOWS (SEE GUIDELINES):

$g = 27 \frac{\text{ft}}{\text{sec}^2} > 15.8 \frac{\text{ft}}{\text{sec}^2}$  (TOT. G-HIC R.A.) : ASSUME  $\frac{g}{g_{\text{std}}} = \frac{27}{27} = 1.0$

$$\therefore Q_{P3} = 9900 \left(1 - \frac{15.8}{27}\right) = 1800 \text{ cfs}$$

$H_3 = 2.2'$  (ABOVE SPILLW. CREST)  $< 4'$  SPILLW. TO TOP OF  
 DAM FREEBOARD. (WL. = EL. 318.0' MSL)

THEFORE, THE DAM WILL NOT BE OVERTOPPED UNDER  
 THIS PMF CONDITIONS, BECAUSE OF THE EFFECT OF  
 THE RELATIVE LARGE RESERVOIR STORAGE CAPACITY AND  
 EXISTING SPILLWAY. HOWEVER, THE RESULTING BACKWATER  
 COULD FLOOD LOW AREAS ALONG HUNTINGTON ST. TO THE  
 NORTHEAST OF THE RESERVOIR.

### 4A) SUMMARY

PEAK INFLOW:  $Q_{P1} = 9900 \text{ cfs}$

PEAK OUTFLOW:  $Q_{P3} = 1800 \text{ cfs}$

AVE. SURCHARGE  $H_3 = 2.2'$  ABOVE SPILLWAY CREST

RESERVOIR WL. = 318.0' MSL

TOP OF DAM ELEV. = 319.8' MSL

SPILLWAY CREST ELEV. = 315.8' MSL (USGS LONG MILE QUAD. W.S. EL. 315 MSL)

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Project TRAP FALLS RESERVOIR DAM  
Computed By \_\_\_\_\_ Checked By \_\_\_\_\_  
Field Book Ref. \_\_\_\_\_ Other Refs. \_\_\_\_\_

Sheet \_\_\_\_\_ of \_\_\_\_\_  
Date \_\_\_\_\_  
Revisions \_\_\_\_\_

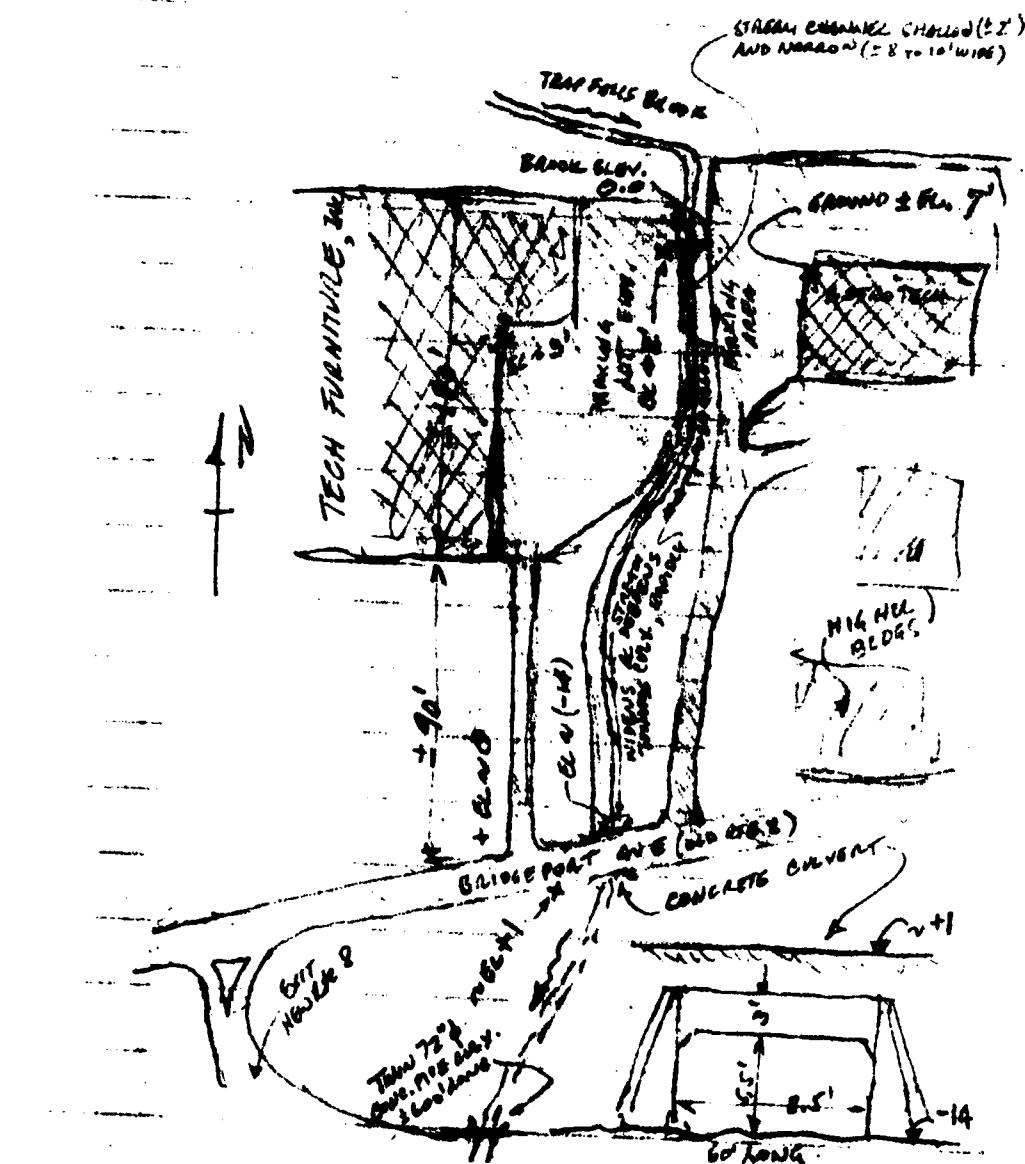
NOTE:

THESE COMPUTATIONS HAVE BEEN PERFORMED  
BASED UPON A DAM BREACH WITH A SUR-  
CHARGED WATER SURFACE ELEVATION. IN  
ACCORDANCE WITH NORMAL CORPS PRO-  
CEDURES, COMPUTATIONS ARE PERFORMED  
BASED UPON A WATER SURFACE ELEVATION  
AT THE TOP OF THE DAM. A DAM BREACH WITH  
THE WATER SURFACE AT THE TOP OF THE DAM  
AND WITHOUT HEAVY DOWN STREAM CHANNEL  
FLOW COULD BE MORE CRITICAL THAN A  
DAM BREACH WITH A SURCHARGE. THE  
DIFFERENCE, IN THIS CASE, IS NOT SUB-  
STANTIAL.

INSPECTION OF ARMS

file 7/13/78

TRAP FALLS R.R. D/S. IMPACT AREA (STAGE ± 24')



**APPENDIX**

**SECTION E: INVENTORY OF DAMS  
IN THE UNITED STATES**

# INVENTORY OF DAMS IN THE UNITED STATES

STATE NUMBER	DIVISION	STATE	COUNTY	STATE	COUNTY	COM- MUN.	NAME	REPORT DATE
CY 91	NEW	CT	001	05			TRAP FALLS RESERVOIR DAM	4115.9 7308.4 08SEP78

POPULAR NAME	NAME OF IMPOUNDMENT
	TRAP FALLS RESERVOIR

RECON BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY - TOWN - VILLAGE	DIST FROM DAM (MIL.)	POPULATION
C 1 07	PUMPKIN GROUND BROOK	STRATFORD	4	50500

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STORAGE HEIGHT (FT.)	HYDRAULIC HEAD (FT.)	IMPOUNDING CAPACITIES (ACRE-FT.)	DIST. UNR	FED R	PRIVATED	SC3 A	VER/DATE
CIPG	1916	S	52	48	8500	7100	NED	N	N	24AUG78

## REMARKS

U.S. SPILLWAY HAS LENGTH (FT.)	MAXIMUM TYPE WIDTH (FT.)	VOLUME OF DAM (CIV)	POWER CAPACITY INSTALLED (KWH)	PROPOSED (KWH)	NO. OF SPILLWAYS LENGTH (FT.)	NAVIGATION LOCKS LENGTH (FT.)
1 1080	U 156	4300				

## REMARKS

OWNER	ENGINEERING BY	CONSTRUCTION BY
MIDPOINT HYDRAULIC CO	ALBERT B MILL	

DESIGN	CONSTRUCTION	REGULATORY AGENCY	OPERATION	MAINTENANCE
NONE	NONE		NONE	NONE

INSPECTION BY	INSPECTION DATE	AUTHORITY FOR INSPECTION
CAMN ENGINEERS, INC	08JUN78	PL-367

REMARKS
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